REMOVAL SITE EVALUATION TRIP REPORT
REVISION 01

RADIATION – STANDARD PRODUCTS, INC. (FORMER)
WICHITA, KANSAS

CERCLIS ID KSN000705966

Superfund Technical Assessment and Response Team (START) 3

Contract No. EP-S7-06-01, Task Order No. 0131

Prepared For:

U.S. Environmental Protection Agency
Region 7
901 North 5th Street
Kansas City, Kansas 66101

August 17, 2009

Prepared By:

Tetra Tech EM, Inc.
415 Oak Street
Kansas City, Missouri 64106
(816) 412-1741

INTRODUCTION

Tetra Tech EM Inc. (Tetra Tech) was tasked by the U.S. Environmental Protection Agency (EPA) Region 7 to conduct a removal site evaluation (RSE) at the former Standard Products, Inc., site (Standard Products) in Wichita, Kansas. The assessment was conducted under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the Superfund Amendments and Reauthorization Act (SARA) of 1986. The project was assigned under Superfund Technical Assessment and Response Team (START) Contract No. EP-S7-06-01, Task Order No. 0131. The former Standard Products facility was the location of an aircraft instrument repair shop in the 1950s and 1960s (Kansas Department of Health and Environment [KDHE] 2006). An investigation at the site by KDHE, reported in March 2006, identified radium-226 impacted soil on the site (KDHE 2006).

The primary objective of the RSE was to determine the extent of radium-226 contamination (and other associated radionuclides) in surface and subsurface soils and within interior buildings at the Standard Products site. To accomplish this objective, START conducted on-site and off-site real-time monitoring of surface and subsurface soils, and collected soil samples for laboratory analysis. EPA conducted interior gamma surveys of on-site buildings. In addition, electret ion chamber radon detectors were deployed to measure airborne levels of radon. This trip report details the sampling activities and results, and any deviations from the approved quality assurance project plan (QAPP).

AREA LOCATION/DESCRIPTION

The Standard Products site is located in Wichita, Kansas, in the southeast quarter of Section 36, Township 25 South, Range 1 West (see Appendix A, Figure 1). The site includes several parcels, including 650 East Gilbert Street, the location of the former Standard Products facility, and adjoining parcels where radiologically impacted soil has been identified, including a private residence at 920 S. St. Francis Street and the Guadalupe Clinic at 940 S. St. Francis Street (see Appendix A, Figure 2). The approximate center of the 650 East Gilbert Street parcel is at the following coordinates: 37.674880 degrees north latitude and 97.330500 degrees west longitude. The 650 E. Gilbert Street parcel occupies approximately 2.67 acres and is the location of a single 11,000-square-foot warehouse currently occupied by Phillips Southern Electric. The 920 S. St. Francis Street parcel is a private residence with a single-story house, a carport, several small detached sheds, and lawn and landscaped areas. The private residence occupies approximately 0.125 acre. The 940 S. St. Francis Street parcel is a single-story brick building occupied by the Guadalupe Clinic, a community healthcare clinic.

PREVIOUS INVESTIGATIONS

KDHE performed a Unified Focus Assessment (UFA) at the Standard Products site in 2006. An initial screening survey of the property by KDHE identified several areas with total gamma radiation readings above background. The maximum screening result in this area was 17,000 microRoentgens per hour (µR/hr). Laboratory results indicated a maximum radium-226 detection of 81,800 picoCuries per gram (pCi/g) (KDHE 2006).

SAMPLING ACTIVITIES

Field work for the RSE was conducted during the week of March 23, 2009. Tetra Tech START team members included Rob Monnig, project manager, and Colin Willits. Randy Schademann, Don Lininger, Megan Brunkhorst, and James Johnson, EPA Region 7 On-Scene Coordinators, were also on site. Additional visits were made on April 14 and 21, 2009 and May 5, 2009 to conduct additional radon monitoring and soil sampling. Field activities proceeded in accordance with the approved QAPP, except as noted in this report. All sampling related activities were recorded in a logbook (see Appendix C). Photographs were also taken to document site activities (see Appendix D).

Surface Soil Gamma Survey

EPA and START conducted a survey of gross gamma activity over exterior land areas of the site. The survey data was generated using a Ludlum Model 2221 ratemeter with a Ludlum Model 44-20 sodium iodide (NaI) scintillation detector coupled with a Trimble Global Positioning System (GPS) unit and a notebook computer running Rapid Assessment Tool Software (RATS). RATS is a software program developed by the EPA Region 5 Field Environmental Decision Support (FIELDS) Team that integrates real-time data from GPS and environmental monitoring devices. RATS stores the sample data with its GPS location in a file and plots the results in a dynamic, two-dimensional display in real time. To conduct the survey, the surveyor walked in a forward direction at 1 to 2 feet per second while swinging the detector back and forth, and holding the detector approximately 6 inches above the ground, thus generally covering a serpentine pattern over the ground surface. The survey detected multiple areas of elevated gamma readings. Figure 3 in Appendix A presents the survey results.

Subsurface Soil Gamma Survey and Sampling

Multiple soil borings were advanced at the site to assess the vertical extent of radionuclide contamination. The locations of the soil borings are identified on Figure 4 in Appendix A. The soil borings were advanced up to depths of 8 feet below ground surface (bgs) using a track-mounted GeoProbe® equipped

with a Macrocore® sampler. Continuous soil cores were collected into Macrocore sleeves as the borings were advanced. In-situ subsurface gamma activity was logged at 1-foot intervals within the boreholes using a Ludlum Model 44-62 0.5-inch (") diameter by 1" thick NaI scintillation detector connected to a Ludlum Model 2241-3 ratemeter. Soil samples were collected from selected soil borings for laboratory analysis for radionuclides. Samples were submitted to the EPA National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama. Figure 5 in Appendix A presents the vertical gamma profiling data, identifies the vertical intervals where soil samples were collected, and presents the laboratory-determined radium-226 concentrations of the collected soil samples.

From the 650 E. Gilbert Street parcel, six surface soil samples (650-SS-9-1, 650-SS-12-1, SS-23-1, 650-SS-24-1, and 650-SS-BGA, and 650-SS-BGB) were collected from areas exhibiting elevated gamma readings and from background locations. The locations of these soil samples are identified on Figure 4 in Appendix A. Samples were submitted to NAREL in Montgomery, Alabama.

During a subsequent investigation trip on May 5, 2009, START collected four soil samples from two locations (902-01 and 902-02) from the 920 S. St. Francis Street parcel within identified areas of concern. The locations of these soil samples are identified on Figure 4 in Appendix A. Samples were submitted to the GEL Laboratories, LLC (GEL) in Charleston, South Carolina.

Interior Gamma Surveys and Radon Monitoring

EPA conducted interior surveys within the Phillips Southern Electric warehouse building on the 650 E. Gilbert Street Parcel, within the Guadalupe Clinic building on the 940 S. St. Francis Street parcel, and within the private residence at 920 S. St. Francis Street. A Ludlum Model 2241-2 ratemeter with a Ludlum Model 44-10 NaI scintillation detector and a Ludlum Model 192 MicroR meter were used to conduct the interior gamma surveys. Readings above background levels were not observed within the Guadalupe Clinic. Elevated gamma readings were observed within the private residence and within the Phillips Southern Electric warehouse. These elevated readings were attributed to radiologically impacted soil located adjacent to or beneath these structures.

Monitoring for radon, a daughter product of radium, was conducted within the 920 S. St. Francis Street private residence and within the Guadalupe Clinic to determine if radium may have impacted indoor air quality. Electret ion chamber radon detectors (EC) were used to measure indoor radon concentrations. An EC contains a charged electret (an electrostatically-charged disk of Teflon®), which collects ions formed in

the chamber by radiation emitted from radon and radon decay products. When the device is exposed, radon diffuses into the chamber through filtered openings. Ions generated continuously by decay of radon and radon decay products are drawn to the surface of the electret and reduce its surface voltage. The amount of voltage reduction is related directly to the average radon concentration and the duration of the exposure period (EPA 1992).

On April 14, 2009, START deployed RadElec E-PERM® ECs within the 920 S. St. Francis Street residence and within the Guadalupe Clinic. The ECs were deployed in pairs within the following rooms: a bedroom of the 920 S. St. Francis Street residence, the cafeteria of the Guadalupe Clinic, and at the nurse's station in the Guadalupe Clinic. The ECs were left in place for an exposure period of 7 days. On March 21, 2009, START collected the ECs. START measured both the initial and final voltages of the electrets and used RadElec's software to determine the radon concentrations. The measured radon concentrations were all below the EPA-established health-based level of 4 picoCuries per liter (pCi/L). The radon measurement results are presented in Appendix B, Table 1.

ANALYTICAL DATA SUMMARY

Soil samples collected on March 23, 2009, from the 650 E. Gilbert Street parcel were submitted to NAREL for the following analyses: gross alpha/beta, radionuclides by gamma spectroscopy, and uranium and thorium by extraction chromatography. Table 2 in Appendix B summarizes the analytical results for soil samples collected from the 650 E. Gilbert Street parcel. Soil samples collected on May 5, 2009, were submitted to GEL for radium-226 analysis by bismuth-ingrowth/gamma spectroscopy. Table 3 in Appendix B summarizes the analytical results for soil samples collected from the 920 S. St. Francis Street parcel. The laboratory data suggest that elevated gamma activity at the site can be attributed primarily to radium-226 and its progeny. The analytical reports are included in Appendix E.

Standards have been developed for cleanup of radiation-contaminated soil under the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, as found in 40 *Code of Federal Regulations* (CFR) Part 192; however, these standards were developed specifically for uranium mill tailings sites. The purpose of these standards was to limit the risk from inhalation of radon decay products in houses built on mine tailings, and to limit gamma radiation exposure to people using contaminated land. UMTRCA specifies two cleanup standards based on the concentrations of radium-226: (1) a surface soil cleanup to 5 pCi/g and (2) a subsurface soil cleanup to 15 pCi/g. An EPA Memorandum of February 12, 1998, clarifies the use of these two UMTRCA soil cleanup standards for CERCLA sites (EPA 1998). The

surface soil standard of 5 pCi/g of radium-226 is a health-based standard and was developed to control the hazard from gamma radiation; therefore, this standard may be appropriate and relevant to CERCLA sites. The subsurface soil standard of 15 pCi/g of radium-226 was not developed as a health-based standard, but specifically for uranium mill tailings sites as a tool for locating discrete deposits of high-activity tailings in the subsurface using field instruments; therefore, this subsurface soil standard may not be appropriate or relevant to the Standard Products site. For the site, EPA has established a time-critical removal action level for radium-226 of 5 pCi/g above background in soil. The mean radium-226 concentration of the background soil samples collected from the 650 E. Gilbert Street parcel is 2.16 pCi/g. Therefore, the estimated time-critical removal action for the Standard Products site for radium-226 is 7.16 pCi/g. Multiple samples collected from the site exhibited radium-226 concentrations above the estimated removal action level (see Appendix B, Tables 2 and 3).

DEVIATION FROM THE QAPP

The QAPP specifies use of a Durridge RAD7 direct read radon monitor. Instead of a Durridge RAD7, E-PERM® electret ion chambers manufactured by Rad-Elec were used to measure indoor radon concentrations. Use of the E-PERM electret ion chambers meets the data quality objectives (DQO) specified in the QAPP as an acceptable method for measuring indoor radon concentrations.

The QAPP specifies laboratory determination of radium-226 concentrations using both gamma spectrometry and alpha spectrometry methods; however, due to limited resources at NAREL, only the gamma spectrometry method was used for determining radium-226 concentrations from samples collected from the 650 E. Gilbert Street parcel.

REMOVAL CONSIDERATIONS

Based on information obtained during this RSE and the previous site assessment performed by KDHE, a removal action is warranted at the Standard Products site to address radium-226 contamination in surface and subsurface soils. A removal site evaluation form is provided in Appendix F.

PRE-REMEDIAL CONSIDERATIONS

Pre-remedial issues had been evaluated as part of the KDHE UFA of the site in 2006. Based on the results of this assessment, no further pre-remedial investigation activities appear warranted.

REFERENCES

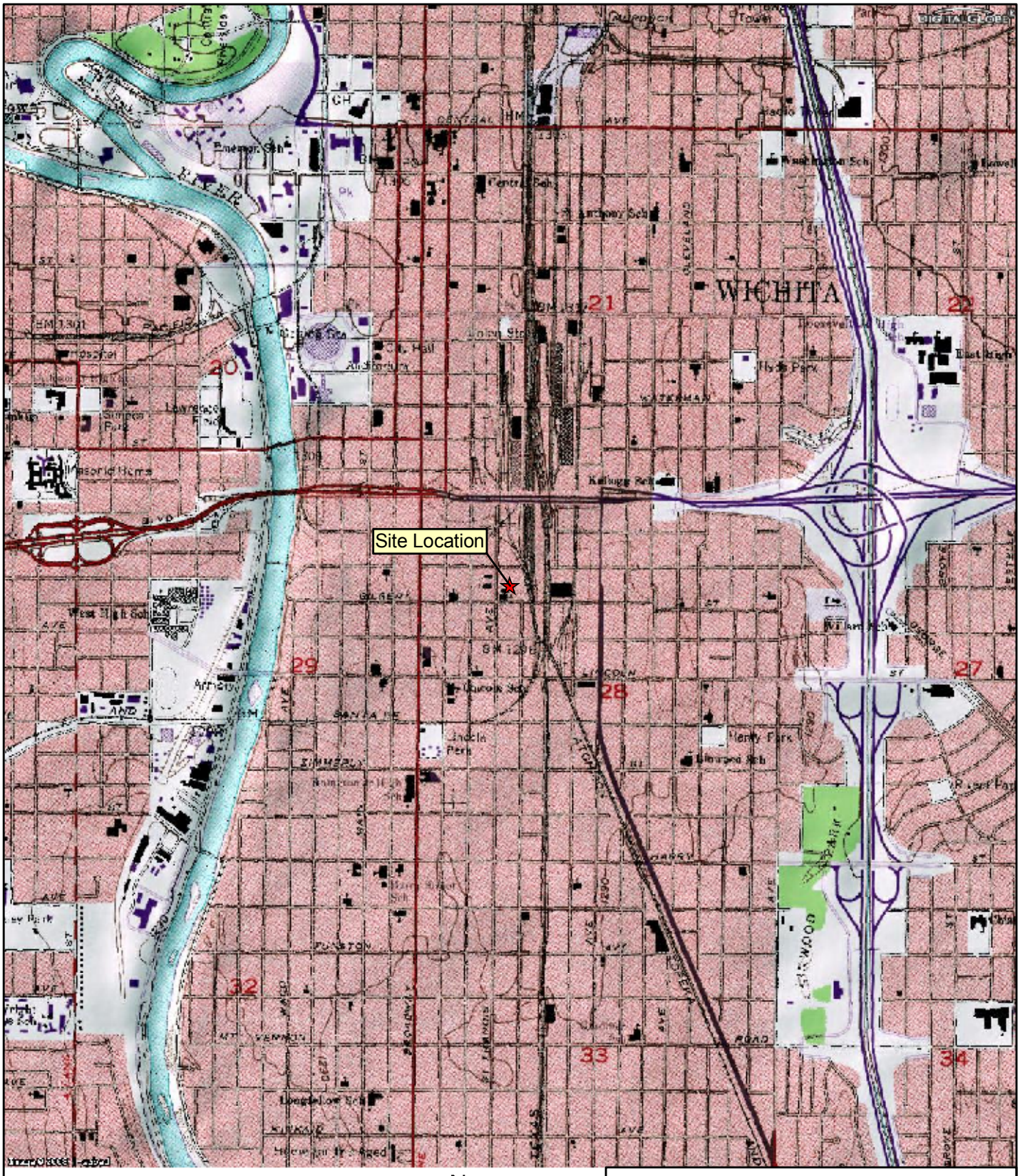
Kansas Department of Health and Environment (KDHE). 2006. Unified Focus Assessment Report, Standard Products, Inc. (Former), 650 East Gilbert, Wichita, Kansas. March.

U.S. Environmental Protection Agency (EPA). 1998. Interoffice Memorandum Regarding Use of Soil Cleanup Criteria in 40 *Code of Federal Regulations* (CFR) Part 192 as Remediation Goals for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sites. From Stephen D. Luftig, Director of Office of Superfund Remediation Technology Innovation. To Distribution. February 12.

EPA. 1992. Indoor Radon and Radon Decay Product Measurement Device Protocols. Office of Air and Radiation. EPA 402-R-92-004. July.

APPENDIX A

FIGURES



Note: The Environmental Protection Agency does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any injury or loss resulting from the reliance upon the information shown.

Source: ImageConnect USGS 1:24k Topo Stack

Radiation - Standard Products, Inc. (Former)
Wichita, Kansas

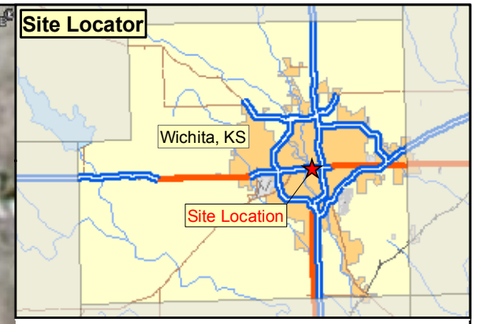
Figure 1

Site Location Map

TETRA TECH EM INC.

Date: 07/23/2009 Drawn By: Colin Willits Project No: 103DX9004L090131000

X:\GIS\9004\0131\Projects\mxd\RSE_Figure1.mxd



Legend

Local Road

N

30 0 30

Feet

Note: The Environmental Protection Agency does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any injury or loss resulting from the reliance upon the information shown.

Source: Image Connect, Globe Xplorer Premium Stack, 2008
ESRI Media Kit, 2007

Radiation - Standard Products, Inc. (Former)
Wichita, Kansas

Figure 2

Site Layout Map

TETRA TECH EM INC.

Date: 07/23/2009 Drawn By: Colin Willits Project No: 103DI9004L090131000

X:\GI9004\0131\Projects\mxd\RSE_Figure2.mxd

Legend

Gamma Survey Location

- < 17,659 cpm
  Below Investigation Level
- 17,659 - 31,794 cpm
  Investigation Level to 2x Background
- 31,794 - 47,691 cpm
  2x Background to 3x Background
- 47,691 - 63,588 cpm
  3x Background to 4x Background
- > 63, 588 cpm
  > 4x Background
- Local Road

cpm - counts per minute

Notes: Measurements were collected using a Ludlum 3x3 detector.

The Investigation Level is the mean of background readings plus 10 times the standard deviation of the background readings. Areas that exhibited gamma activity above the Investigation Level were subjected to additional investigation following the initial surface soil gamma survey.

N

30 0 30

Feet

Note: The Environmental Protection Agency does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any injury or loss resulting from the reliance upon the information shown.

Source: RAT System Survey, March 2009
Image Connect, Globe Xplorer Premium Stack, 2008
ESRI Media Kit, 2007

Radiation - Standard Products, Inc. (Former)
Wichita, Kansas

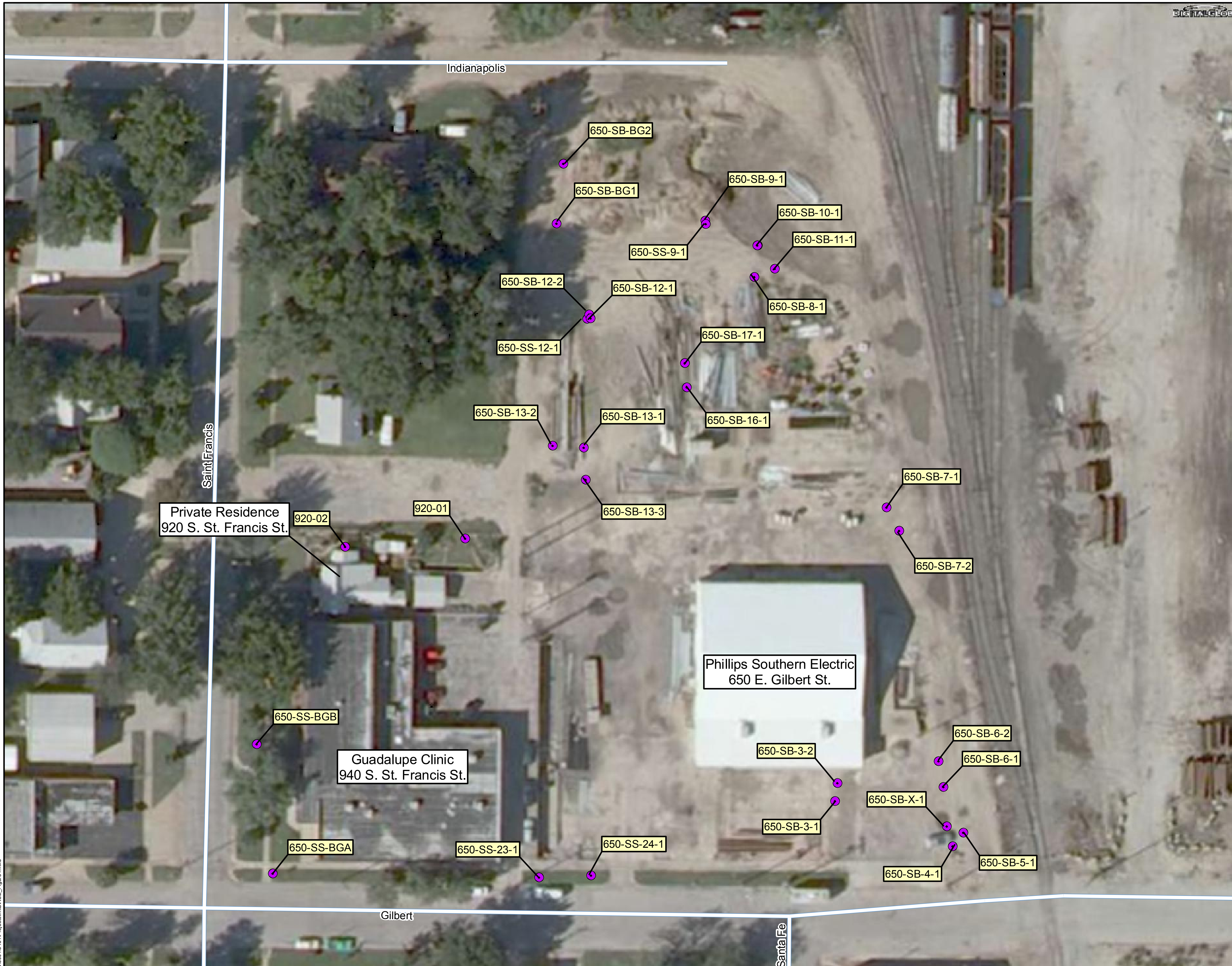
Figure 3

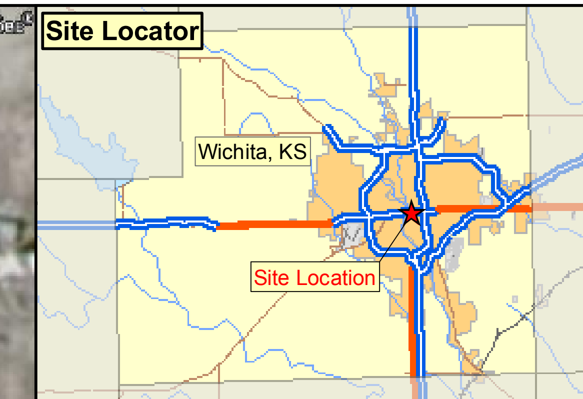
Gamma Survey Results Map

TETRA TECH EM INC.

Date: 07/24/2009 Drawn By: Colin Willits Project No: 103DI9004L090131000

X:\DI9004\0131\Projects\mxd\RSE_Figure3.mxd





Legend

- Soil Sample Location
- Local Road

N

30 0 30

Feet

Note: The Environmental Protection Agency does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any injury or loss resulting from the reliance upon the information shown.

Source: RAT System Survey, March 2009
Image Connect, Globe Xplorer Premium Stack, 2008
ESRI Media Kit, 2007

Radiation - Standard Products, Inc. (Former)
Wichita, Kansas

Figure 4

Soil Sampling Location Map

TETRA TECH EM INC.

Date: 07/23/2009 Drawn By: Colin Willits Project No: 103DI9004L090131000

X:\G\9004\0131\Projects\mxd\RSE_Figure4.mxd

Depth (ft bgs)	650-SB-BG1	650-SB-BG2	650-SB-3-1	650-SB-3-2	650-SB-4-1	650-SB-5-1	650-SB-6-1	650-SB-6-2	650-SB-7-1	650-SB-7-2	650-SB-8-1
0.0 - 1.0	1.1	1.4	300.0	32.0	9.0	19.6	12.9	84.0	6.8	33.7	2.5
1.0 - 2.0	1.7	1.8	95.0	5.6	2.5	3.4	3.6	13.0	2.4	8.5	
2.0 - 3.0	2.2	2.0	81.0	3.4	2.0	2.0	2.1	2.4	2.1	2.5	
3.0 - 4.0	1.8	2.0	173.0	4.2	1.9	1.7	1.8	2.1	1.8	1.8	
4.0 - 5.0	1.9	1.9	315.0	5.4	1.7	1.6	1.6	1.8	1.6	1.6	
5.0 - 6.0	2.0	1.9									
6.0 - 7.0	1.7	1.8									
7.0 - 8.0	1.9	1.9									

Depth (ft bgs)	650-SB-10-1	650-SB-11-1	650-SB-12-1	650-SB-12-2	650-SB-13-1	650-SB-13-2	650-SB-13-3	650-SB-16-1	650-SB-17-1	650-SB-X-1
0.0 - 1.0	2.1	1.7	34.3	10.1	3.5	367.0	47.4	15.2	90.2	5.5
1.0 - 2.0	2.1	1.7	17.3	14.1	2.2	23.6	8.4	4.6	21.2	3.1
2.0 - 3.0	1.8	1.5	6.7	5.5	2.0	8.7	2.5	2.4	4.2	2.0
3.0 - 4.0	2.1	1.8	2.9	2.8	1.9	3.2	2.2	2.2	2.5	1.9
4.0 - 5.0	1.9	1.9	2.3	2.4	2.0	2.3	1.9	1.9	1.8	1.6
5.0 - 6.0										
6.0 - 7.0										
7.0 - 8.0										

650-SB-10-1	6.89				10.4					
	ND				5.14					
						302			302	
						1.7			2.75	
									(0 - 3.5 FT)	

KEY

650-SB-17-1 — Boring Name

90.2 / 21.2 / 4.2 / 2.5 / 1.8 — Indicates soil sample was collected from this interval and submitted for laboratory analysis

302 / 2.75 — Laboratory determined radium-226 concentration in picoCuries per gram (pCi/g)

In-situ downhole gamma readings observed using Ludlum Model 44-62 detector in thousand counts per minute (kcpm)

Note: The Environmental Protection Agency does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any injury or loss resulting from the reliance upon the information shown.

Radiation - Standard Products, Inc. (Former)
Wichita, Kansas

Figure 5
Downhole Gamma Logging Results

TETRA TECH EM INC.

Date: 8/13/2009 Drawn by: Robert Monnig Project No. 103DX9004L090131

APPENDIX B

TABLES

TABLE 1

RADON MONITORING RESULTS
RADIATION - STANDARD PRODUCTS, INC. (FORMER), WICHITA, KANSAS

E-PERM® Serial Number	Location	Start Date	Start Time	Finish Date	Finish Time	Sample Time (Days)	Background Gamma[1] (µR/hr)	Rn-222 (pCi/L)
SDH638	920 S. St. Francis Street - Bedroom	4/14/2009	11:15	4/21/2009	11:48	7.02	12	**2.8**
SEU325	920 S. St. Francis Street - Bedroom	4/14/2009	11:15	4/21/2009	11:48	7.02	12	**3.3**
SEU339	Guadalupe Center - Lunch Room	4/14/2009	11:25	4/21/2009	11:51	7.02	14	**0.8**
SDH570	Guadalupe Center - Lunch Room	4/14/2009	11:25	4/21/2009	11:51	7.02	14	**1.1**
SEU464	Guadalupe Center - Nurse's Station	4/14/2009	11:34	4/21/2009	11:48	7.01	9	**1.0**
SDK324	Guadalupe Center - Nurse's Station	4/14/2009	11:34	4/21/2009	11:48	7.01	9	**1.0**

Notes:
[1] Estimated background gamma activity based on field observation of Ludlum Model 192 microR detector.

pCi/L picoCuries per liter
Rn Radon
µR/hr microRoentgens per hour

TABLE 2

LABORATORY RESULTS FOR SOIL SAMPLES COLLECTED FROM 650 E. GILBERT STREET
RADIATION - STANDARD PRODUCTS, INC. (FORMER), WICHITA, KANSAS

Sample Information		Gross Alpha/Beta Analysis[1]		Gamma Spectroscopy Analysis[2]													Misc. Radionucludes		Thorium Analysis[3]				Uranium Analysis[4]		
				Uranium-238 Decay Series					Thorium-232 Decay Series					Uranium-235 Decay Series											
Sample Name	Date Collected	Alpha	Beta	Th-234	Ra-226 *	Pb-214 *	Bi-214*	Pb-210	Ra-228	Ra-224	Pb-212	Bi-212	Tl-208	U-235 *	Th-227	Ra-223 *	Cs-137	K-40	Th-227	Th-228	Th-230	Th-232	U-234	U-235	U-238
650-SB-7-2 (0-1 FT)	3/26/2009	7.00	33.00	---	13.3	9.82	9.14	---	0.535	0.816	0.549	0.601	0.176	0.835	---	0.176	0.0973	12.3	---	---	---	---	---	---	---
650-SB-10-1 (0-1 FT)	3/26/2009	79.70	41.10	---	6.89	5.28	4.90	---	0.746	0.440	0.712	0.818	0.229	0.432	---	0.0941	0.0137	21.0	---	---	---	---	---	---	---
650-SB-10-1 (1-2 FT)	3/26/2009	17.00	24.80	1.21	ND	1.17	1.12	---	1.07	0.532	1.05	1.07	0.349	0.112	---	0.238	0.0223	18.5	---	---	---	---	---	---	---
650-SB-13-1 (0-1 FT)	3/26/2009	195.00	56.60	1.30	**10.4**	15.3	14.3	---	0.637	1.59	0.673	0.656	0.226	1.24	---	0.395	0.0529	11.6	---	---	---	---	---	---	---
650-SB-13-1 (1-2 FT)	3/26/2009	67.90	18.80	3.78	5.14	5.13	4.87	4.17	0.878	1.01	0.904	1.11	0.306	0.245	0.236	0.490	ND	7.85	---	---	---	---	---	---	---
650-SB-13-2 (0-3.5 FT)	3/26/2009	3270.00	568.00	---	**302**	247	241	160	ND	16.1	0.805	---	---	---	---	---	ND	15.8	0.0808	0.541	1.03	0.558	1.01	0.0337	0.991
650-SB-13-2 (0-3.5 FT) (laboratory duplicate)	3/26/2009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.105	0.489	0.976	0.61	1.14	0.0953	1.05
650-SB-13-2 (3.5-4 FT)	3/26/2009	47.20	31.70	---	1.7	1.29	1.04	---	1.51	---	1.52	1.63	0.489	0.107	---	---	ND	18.9	---	---	---	---	---	---	---
650-SB-13-3 (0-1 FT)	3/26/2009	2380.00	430.00	---	**187**	142	133	---	ND	9.66	0.946	---	0.224	---	---	---	ND	11.6	---	---	---	---	---	---	---
650-SB-13-3 (1-2 FT)	3/26/2009	252.00	67.10	---	**15.7**	10.5	9.99	---	1.09	1.21	1.04	1.45	0.318	0.983	---	0.604	0.090	16.6	0.0653	0.984	1.29	0.866	1.31	0.100	1.08
650-SB-13-3 (2-3 FT)	3/26/2009	43.20	30.90	0.663	2.31	1.25	1.23	0.773	1.47	---	1.17	1.65	0.484	0.142	---	---	ND	22.0	---	---	---	---	---	---	---
650-SB-17-1 (0-3 FT)	3/26/2009	3080.00	584.00	---	**302**	180	167	---	ND	7.50	0.945	---	0.173	---	---	---	ND	18.8	---	---	---	---	---	---	---
650-SB-17-1 (3-4 FT)	3/26/2009	34.30	37.80	0.712	2.75	1.64	1.54	1.60	1.45	---	1.03	1.51	0.472	0.172	---	---	ND	23.0	---	---	---	---	---	---	---
650-SS-9-1 (surface soil sample)	3/26/2009	98.70	45.70	---	**10.6**	7.44	6.90	---	0.814	1.15	0.815	1.13	0.269	0.666	---	0.208	ND	19.6	---	---	---	---	---	---	---
650-SS-12-1 (surface soil sample)	3/26/2009	13.90	20.80	0.567	1.49	0.828	0.778	2.00	0.742	0.749	0.691	0.769	0.224	0.0936	---	---	0.254	17.0	0.0711	0.787	0.748	0.828	0.709	0.0335	0.882
650-SS-23-1 (surface soil sample)	3/26/2009	178.00	48.10	---	**20.1**	16.2	15.9	8.06	0.595	---	0.717	---	0.105	---	---	---	0.236	17.1	---	---	---	---	---	---	---
650-SS-24-1 (surface soil sample)	3/26/2009	103.00	45.60	---	**8.92**	6.12	5.74	---	0.591	0.931	0.562	0.489	0.129	0.560	---	0.123	0.24	19.2	---	---	---	---	---	---	---
Background Samples																									
650-SS-BGA (background surface soil sample)	3/26/2009	37.00	35.70	0.360	2.81	1.79	1.72	2.00	0.751	0.876	0.731	0.778	0.238	0.177	---	0.196	0.160	18.7	0.0130	0.717	0.600	0.817	0.549	0.0242	0.604
650-SS-BGB (background surface soil sample)	3/26/2009	35.30	25.60	0.410	1.43	0.824	0.820	2.00	0.753	0.592	0.733	0.679	0.238	0.0903	---	0.230	0.254	16.7	0.0415	0.842	0.544	0.561	0.521	0.0444	0.506
650-SB-BG1 (2-3 FT) (background sample)	3/26/2009	34.70	24.10	---	2.29	1.34	1.24	---	1.45	1.22	1.49	1.40	0.498	0.144	---	0.413	ND	20.7	0.121	1.34	1.21	1.24	0.722	0.0456	0.785
650-SB-BG1 (2-3 FT) (laboratory duplicate)	3/26/2009	---	---	0.876	2.26	1.37	1.26	---	1.51	0.900	1.44	1.48	0.481	0.139	---	0.339	ND	21.9	0.0616	1.51	1.29	1.17	0.771	0.0454	0.741
650-SB-BG2 (2-3 FT) (background sample)	3/26/2009	31.70	29.20	0.880	1.99	1.19	1.13	---	1.33	0.933	1.31	1.30	0.430	0.124	---	0.316	ND	20.0	0.0295	1.38	1.10	1.10	0.682	0.0177	0.710
Mean Background Concentration	-	34.68	28.65	0.632	2.16	1.30	1.23	2.00	1.16	0.904	1.14	1.13	0.377	0.135	---	0.299	---	19.6	0.0533	1.16	0.95	0.98	0.649	0.0355	0.669

Notes:
All results are in picoCuries per gram
Shaded cell indicates radium-226 concentrations that exceed the estimated time-critical removal action of 7.16 pCi/g

1	Analytical method: NAREL GR-03 (gross alpha/beta)
2	Analytical method: NAREL GAM-01 (gamma spectrometry)
3	Analytical method: NAREL U-EICHROM (extraction chromatography)
4	Analytical method: NAREL TH-EICHROM (extraction chromatography)
*	Laboratory qualifier indicating the result may be significantly under or over estimated
---	No analysis performed or results not reported for this element
ND	Element not detected at or above the minimum detectable concentration

Elements:

Bi	Bismuth
Cs	Cesium
K	Potassium
Pb	Lead
Ra	Radium
Th	Thorium
Tl	Thallium
U	Uranium

TABLE 3

LABORATORY RESULTS FOR SOIL SAMPLES COLLECTED FROM 920 S. ST. FRANCIS STREET PARCEL RADIATION - STANDARD PRODUCTS, INC. (FORMER), WICHITA, KANSAS

Sample Name	Date Collected	Radium-226[1] (pCi/g)
920-01 (0 - 6")	5/5/2009	**11.3**
920-01 (6 - 12")	5/5/2009	**52.4**
920-02 (0 - 6")	5/5/2009	**495**
920-02 (6 - 12")	5/5/2009	**271**

Notes:
Bold indicates radium-226 concentrations that exceed the estimated time-critical removal action of 7.16 pCi/g
[1] Analytical method: Bismuth Ingrowth/Gamma Spectrometry
pCi/g picoCuries per gram

APPENDIX C

FIELD LOGBOOK

KS1007

"Rite in the Rain"®

ALL-WEATHER

LEVEL

No. 311

Radiation - Standard Products

3/23/09 Standard Products

0143 Arrive at Standard Products site. Conduct tailgate safety meeting.

1459 Collect background 1-min scalar reading at NE corner of St. Frances & Gilbert St. count is 16096 cpm 37.67470 -97.33147

1503 2nd background count in front of Guadalahara Center is 15834 cpm 37.67495, -97.33157.

1505 3rd count is at NW corner of Guadalahara Center. 15761 cpm 37.67516, -97.33141.
START Members onsite are Rob Manning and Colin Willits.

1530 START begins to conduct a surface soil survey for gamma activity using a Ludlum 2221 ratemeter with a 3x3 NAI probe connected to the RAT System. The survey was started at the southwest corner of the property. Data from the survey is logged electronically by the RAT system.

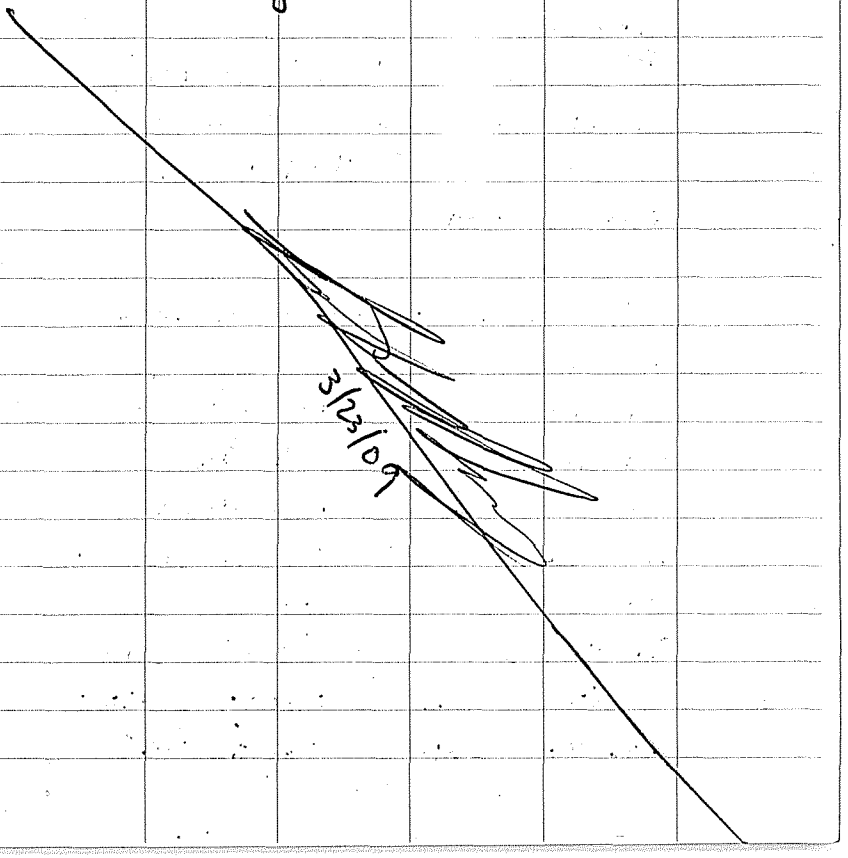
1730 START has continued to survey surface soil for gamma activity.

3/23/09 Standard Products

START stops surveying and begins to shut down for the day.

1750 EPA and START crews is em are given whole body frisks using the pancake probe.

1800 START and EPA depart Standard Products site. START will prepare a preliminary survey map at the hotel.



3/24/09 Standard Products

0730 Arrive at site.

0745 Conduct Safety tailgate meeting

0751 Collect background reading # 1 at same location as yesterday 16339 cpm.
Background Location #2 is 16,065 cpm.
Background Location #3 is 15,900 cpm

0845 STM Willits has been conducting additional transects using the 2241 with 3x3 detector.

0950 STM Monnig will used the Ludlum Model 2241 with 44-10 detector (Instrument ID # 649) to further delineate elevated areas.

0855 STM Monnig records scalar readings with Instrument # 649 at the background locations.

Background #1	11,503 cpm
Background #2	11,403 cpm
Background #3	11,264 cpm.
Average	11,390 cpm
2x Average	22,780 cpm
3x Average	34,170 cpm

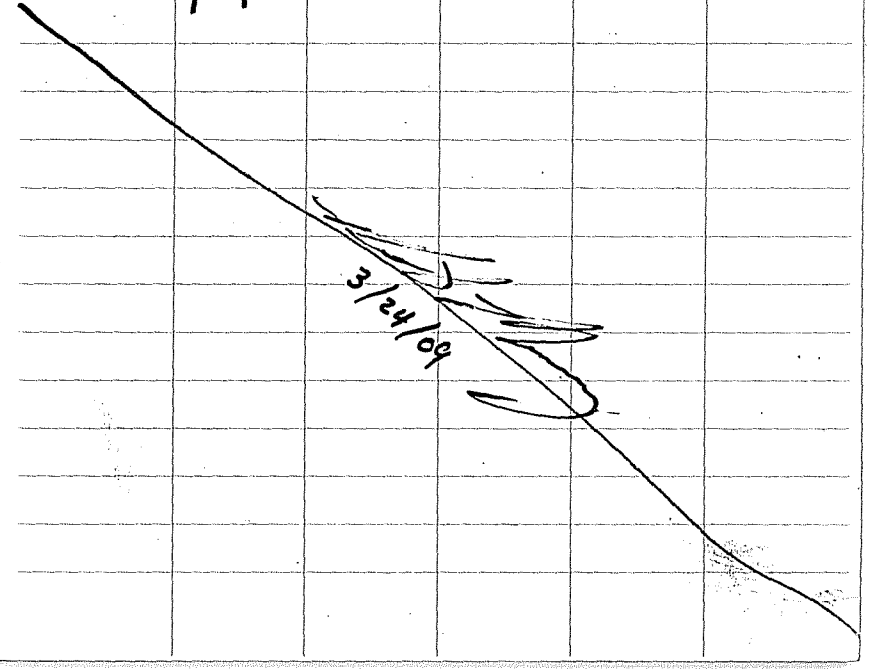
0915 START begins to conduct surface gamma survey using the RAT

3/24/09 Standard Products

System with the 3x3 detector.
~~Eth~~ am R. Monnig begins to scan areas identified by the RAT system yesterday using Ludlum 2x2 (#649). At each elevated area, R. Monnig marks the boundary the exibits 17.1kcpm (which represents 1.5 times background).

1430 START continues to run RAT system and mark elevated areas.

1830 START has continued to use the RAT system. START and EPA prepare to leave site.



3/25/09 Standard Products

0730 Conduct safety meeting at hotel.

0745 Depart hotel to pick up supplies.

0845 Stop at Standard Precision to drop off some marking paint.

0855 Arrive at Standard Products.

0915 Collect 1 minute scalar readings at background locations for instrument #649.

Background Location #1 11,056 cpm.

Background Location #2 11,418 cpm.

Background Location #3 10,993 cpm

0930 R. Monnig continues to delineate hot areas using the Ludlum 2241/44-10 probe (Instrument #649) to find areas exceeding 1.5 x background (~17 kcpm).

1030 Don Liringer OSC and Jeremy are surveying the contours. R. Monnig continues to delineate the hot spots.

1300 Track probe has arrived and is setting up for borings.

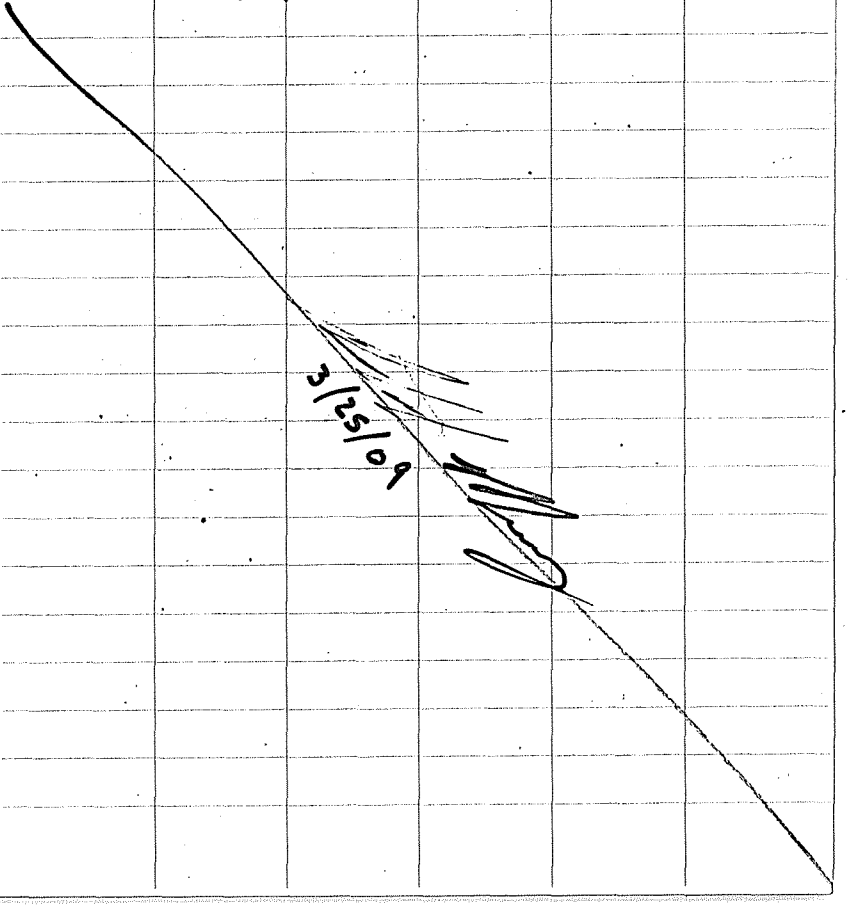
1400 R. Monnig is locating the maximum radiation reading at each of the elevated areas. EPA has begun probing the elevated areas.

1600 R. Monnig has continued to locate

3/25/09 Standard Products

maximum points with the Ludlum 2241 and 44-10 (10 #649). Jeff Rom Colin Willits has arrived at Standard Products.

1700 R. Monnig and C. Willits leave the site. Maps with the RAT data will be prepared at the hotel



3/26/09 Standard Products

0745 Arrive at Standard Products Site.

0755 Conduct safety tailgate meeting.

0820 Collect background readings with Instrument #5165.

Background Location #1 16,090 cpm.

Background Location #2 15,722 cpm.

Background Location #3 15,402 cpm

0845 Colin Willits is using RAT system to survey some of the areas bordering the Standard Products Site.

0900 R. Manning collects background readings using the Ludlum 2241/44-10 (#649)

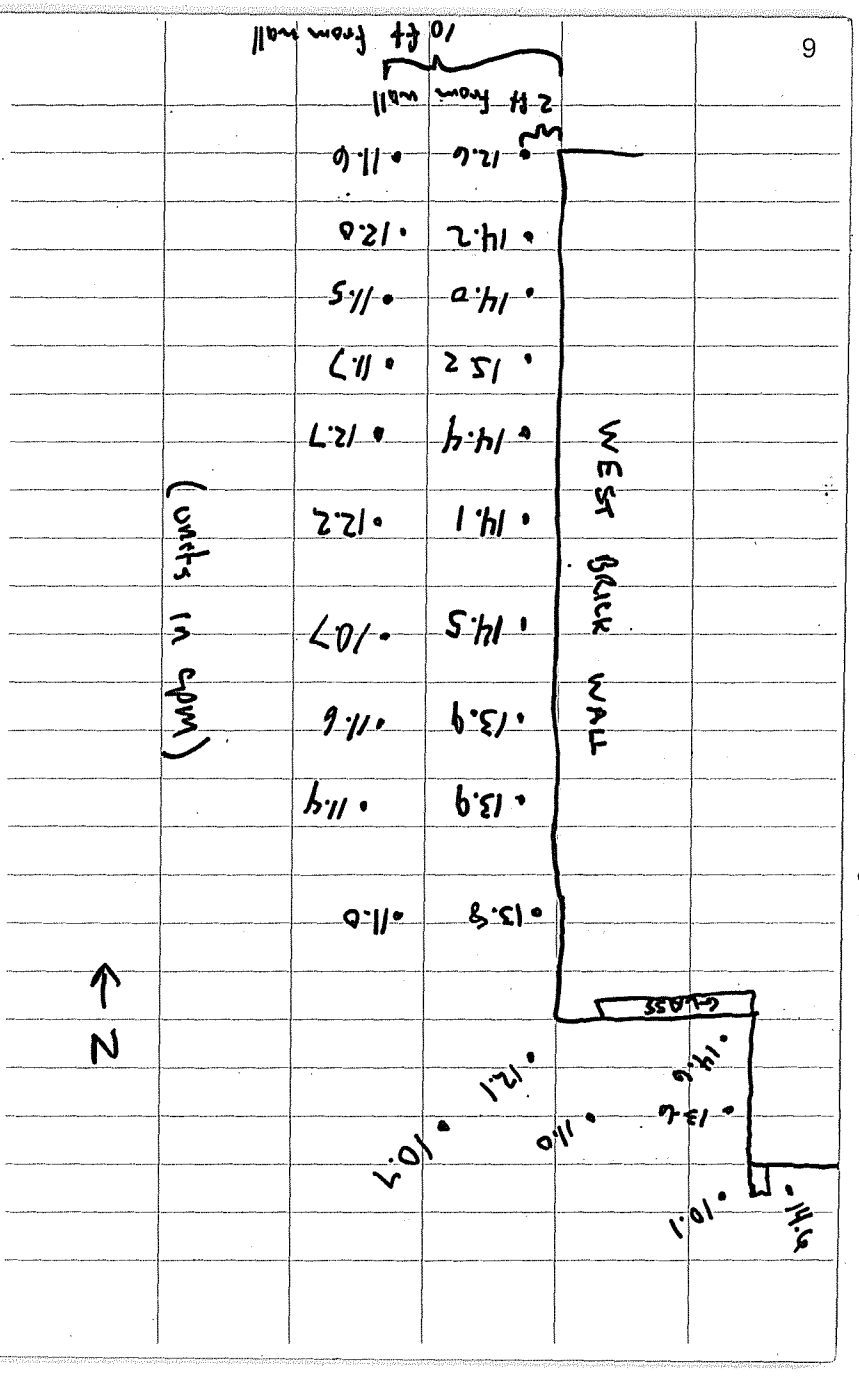
Background Location #1 11,635 cpm

Background Location #2 11,293 cpm

Background Location #3 11,020 cpm

0905 R. Manning collects readings with Ludlum instrument #649 at perimeter of Guadalupe Center, (See next page).

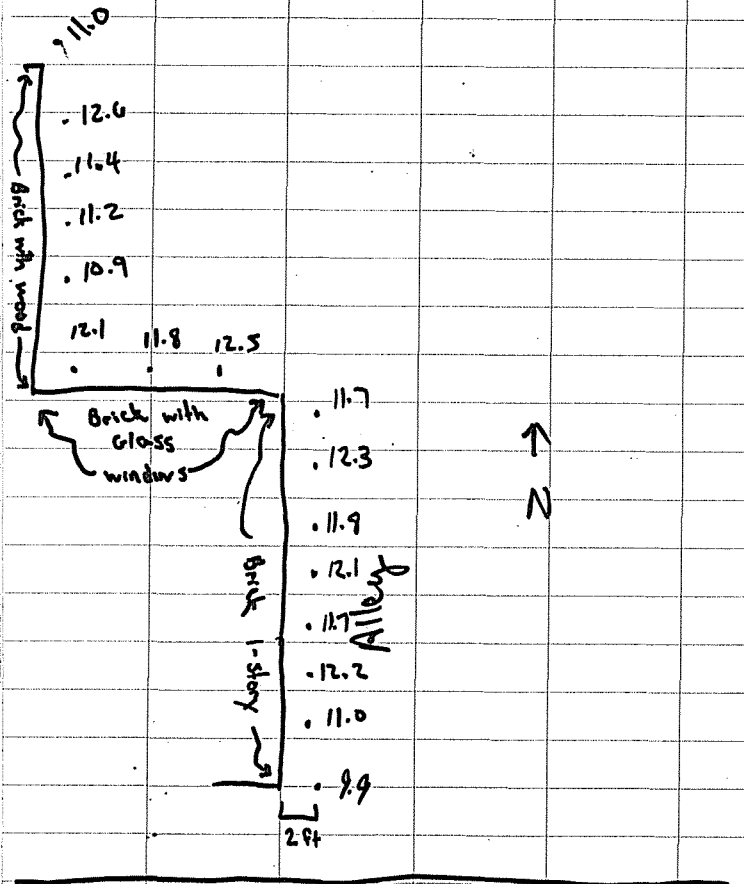
0926 R. Manning Surveys South wall and finds a similar pattern of readings as the west wall with readings of ~14 to 15 cpm with detector 6 inches above ground and 2 feet from wall. Readings drop to background (~11 to 12 cpm)



3/26/09 Standard Products

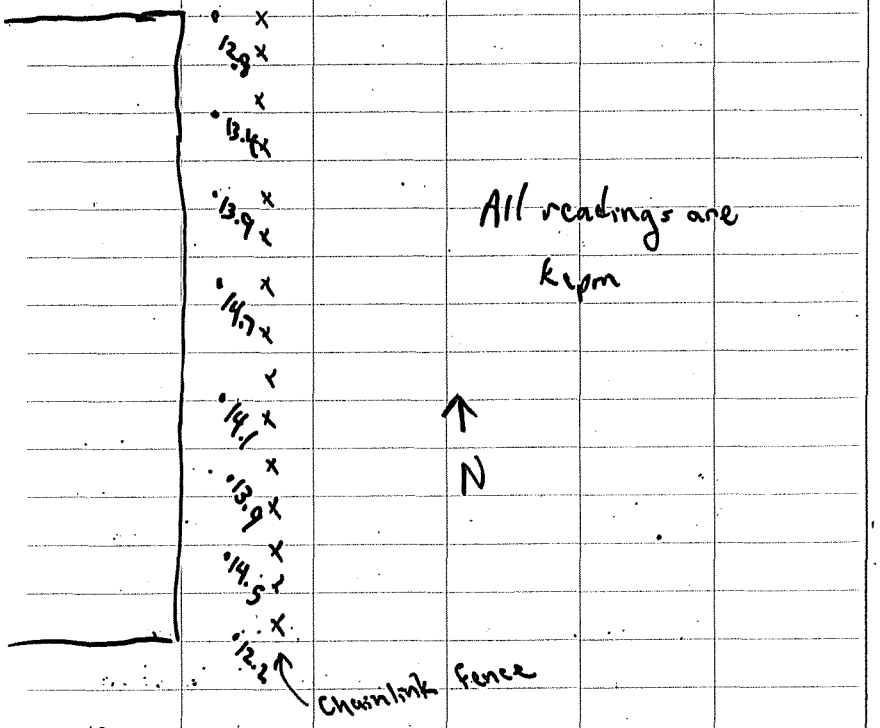
when detector is 1m feet from wall.

0935 R. Monnig scans east side of grn Guadalupe Center.



3/26/09 Standard Products

0940 R. Monnig Surveys north side of building.



1000 R. Monnig holds detector 5 feet off the ground and 2 feet from the brick walls. Readings against wall are ~14-15 kcpm. Holding the detector at 5 feet above ground and away from structures the reading is ~9 kcpm

3/26/09 Standard Products

9 kcpm.

1044 R. Manning and C. Willits collect 1 min scalar points on south side of G. center with 44-20

	37.67472, -97.33103	16,228 counts
	37.67475, -97.33106	18,668 counts
	37.67474, -97.33111	16,983 counts
	37.67475, -97.33113	17,276 counts
	37.67475, -97.33118	15,713 counts
	37.67470, -97.33122	15,663 counts
	37.67476, -97.33121	15,537 counts
	37.67476, -97.33129	14,990 counts
	37.67471, -97.33137	14,992 counts
	37.67471, -97.33140	15,996 counts
	37.67474, -97.33137	16,105 counts
	37.67477, -97.33150	15,320 counts

1100 R. Manning collects six surface soil sample. Sample collection information was logged in Ose Dan Lantinger's logbook.

1300 Break for lunch.

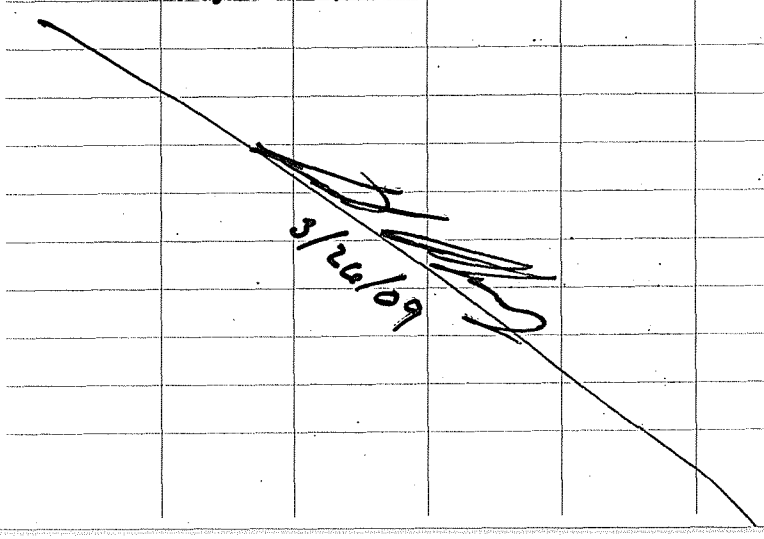
1400 Return from lunch. Colin Willits goes with Jeremey to survey LaRay. R. Manning goes to Standard Precision to help with surveying.

1445 R. Manning and Chuck Hooper goto residence

3/26/09 Standard Products

near Standard Products (yellow house north of Guadalupe center) to screen the interior. R. Manning uses the Ludlum 3241 with 44-10 detector (#649) to screen interior of home. Background in the house is 9.0 to 13 kcpm. North wall of northwest bedroom has readings up to 50 kcpm. This reading appears to be associated with an elevated area in garden area outside of the house. Chuck Hooper with EPA discussed the findings with the home owners.

1515 Chuck Hooper and R. Manning leave residence.



4/14/09 · Standard Products

0730 R. Monnig meets Megan Brunkhorst at the EPA Caves.

0900 Leave for Wichita KS

1015 Take initial readings of E-PERMs.

Serial Number	Volts
Zero	0
RE3352	250
RE3507	260
SEU339	683
SDK324	688
SDH639	671
SEU464	549
SDH570	678
SEU325	683

1115 Setup SDH636 and SEU325 in residence.

1125 Setup SEU339 and SDH570 in lunch room. These are being setup in same location. MicroR reading is 14 μR/hr.

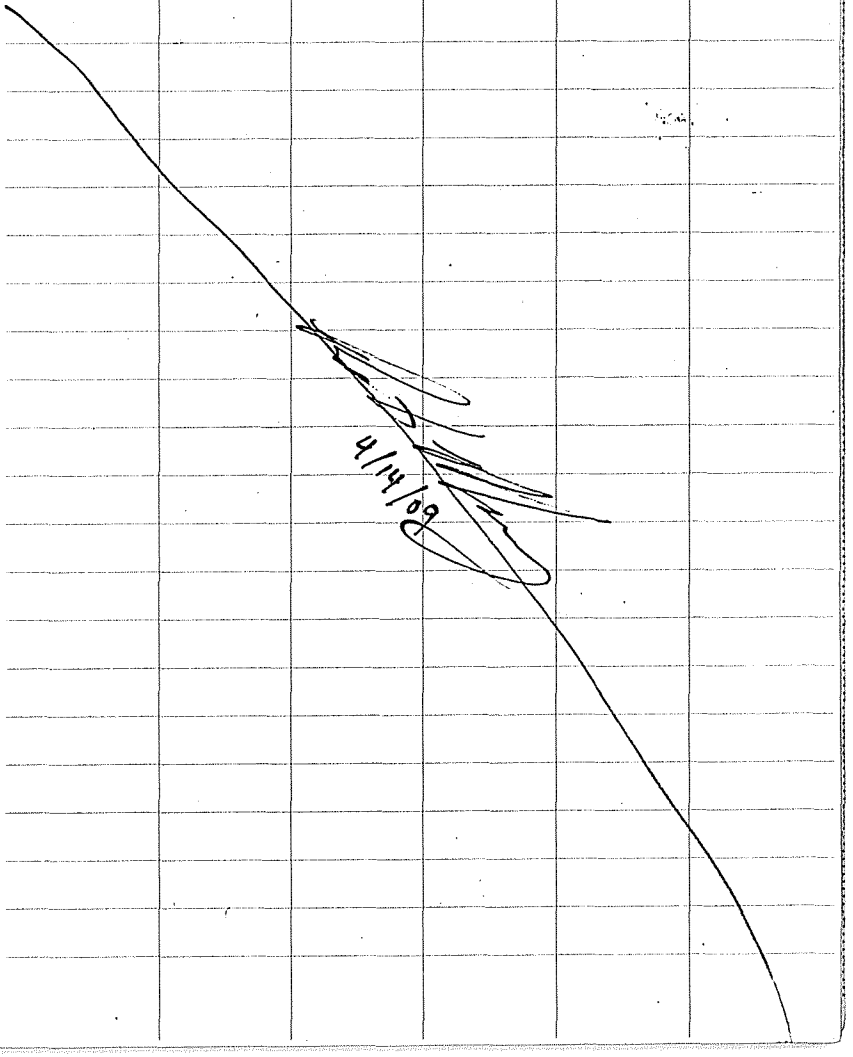
1134 Setup SEU464 and SDK324 at nurses station. MicroR reading is 9 μR/hr. The MicroR reading in the residence was 12 μR/hr.

1145 Leave Guadalupe Center.

1600 Arrive at EPA warehouse.

4/14/09 · Standard Products

1610 MicroR meter used was Unit #33. Bump check with Cs-137 10μC source reads ~1,900 μR/hr. Check was conducted in EPA warehouse.



4/21/09 Standard Products

0830	Depart for Wichita to pick up E-PERMs.
1142	Arrive at Guadalupe Center.
1142	Collect E-PERM. From 920 St. Francis St. E-PERMs have been moved by resident to the side porch. Resident is not home.
1148	Pick up SDK324 and SEU464 from Nurses Station at Guadalupe Health Center.
1151	Pick up SEU464 and SDK324. from Guadalupe Cafeteria.
1212	Measure final readings.

Serial Number	Volts
SEU464	524
SDH638	615
SEU325	620
SEU339	654
SDH570	644
SDK324	6602
RE3352	251
RE3507	261
Zero	0

1245	Headed back to Kansas City.

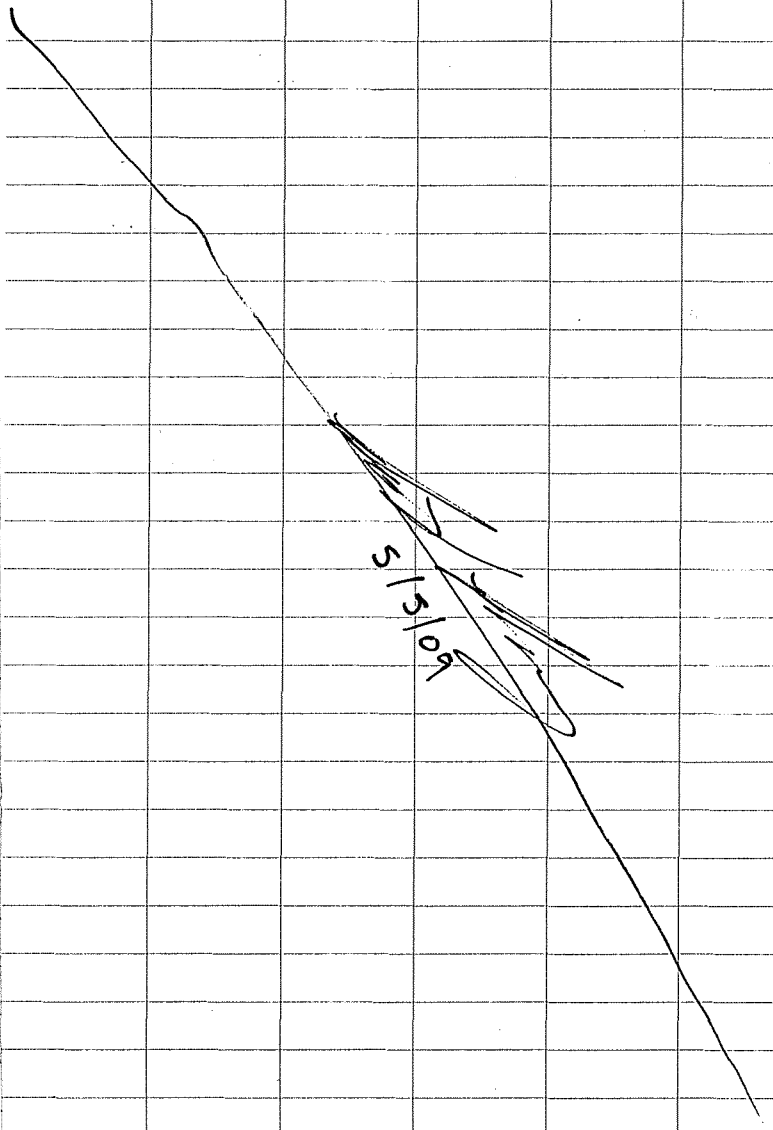
4/21/09

5/5/09 Standard Products

0830	Randy Schadenmann and Rob Manning have traveled to Wichita to meet with Standard Products owners and Mr. Guerro. Randy speaks with owners.
0900	Arrive at 920 S St Francois to meet with Mr. Guerro. Manning and Schadenmann will collect soil samples.
0920	Manning is using the 2x2 to locate sampling points. Instrument ID = 648 Check Source = 232 kcpm. Calibration value is 231 kcpm. Instrument is functioning properly. Background (with detector 6 inches above ground) is 9-11 kcpm.
0935	Collect sample 920-01 0-6" from flower bed at northeast corner of lot.
0945	Collect sample 920-01 6-12" from same location. Ludlum 2x2 reading (6 inches above ground) is 50 kcpm.
0955	Collect sample 920-02 0-6" from flower bed along northernmost wall of house.
1005	Collect sample 920-02 6-12" from same location. Ludlum 2x2 reading is 308 kcpm.

5/5/09 Standard Products

1020 Leave site.



APPENDIX D

PHOTOGRAPHIC LOG

Radiation – Standard Products, Inc. (Former)
Wichita, Kansas

TETRA TECH PROJECT NO. X9004.09.0131.000	DESCRIPTION	This photograph shows Tetra Tech START personnel conducting a gamma survey over the 650 E. Gilbert Street parcel.	1
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: Northeast	PHOTOGRAPHER	Rob Monnig	3/24/2009

TETRA TECH PROJECT NO. X9004.09.0131.000	DESCRIPTION	This photograph shows EPA personnel advancing a soil boring with a Geoprobe® at the 650 E. Gilbert Street parcel.	2
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: West	PHOTOGRAPHER	Randy Schademann	3/25/2009

APPENDIX E

LABORATORY ANALYTICAL REPORT

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171 F 843.766.1178

www.gel.com

June 01, 2009

Mr. Robert Monnig
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Re: Standard Products -Ra226
Work Order: 229665

Dear Mr. Monnig:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 12, 2009. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4297.

Sincerely,

Amanda Rasco
Project Manager

Purchase Order: 1048525
Enclosures

Page: 1 of 1
Project #:
GEL Quote #: GELP09-0367
COC Number (1):
PO Number:

GEL Chain of Custody and Analytical Request

See www.gel.com for GEL's Sample Acceptance SOP

GEL Work Order Number: 229665

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: Tetra Tech — Phone #: 816-412-1775
Project/Site Name: Radium - Standard Products — Fax #:
Address: Wichita, KS
Collected by: Robert Monnig — Send Results To: rob.monnig@ttemi.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

<-- Preservative Type (6)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive	TSCA Regulated	Total number of containers	Radium-226 by Ingrowth / gamma spec										Comments Note: extra sample is required for sample specific QC
920-01 0-6"	~~05/04/09~~ 05/05/09 RCM	0935	N	No	SO			1	X										
920-01 6-12"	↓	0945	N	NO	SO			1	X										
920-02 0-6"	↓	0955	N	NO	SO			1	X										
920-02 6-12"	↓	1005	N	NO	SO			1	X										

TAT Requested: Normal: ✓ Rush: Specify: (Subject to Surcharge) — Fax Results: Yes / (No)

Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

***Remarks:** Are there any known hazards applicable to these samples? If so, please list the hazards*

Insitu gamma reading with Ludlum 2x2 probe: 50-300 kcpm

Sample Collection Time Zone: Eastern, Pacific, (Central), Other ____, Mountain

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	[signature]	5/11/09	1600	1	FedEx		
2				2	[signature] ~~5/13/09~~ RA		
3				3		5/12/09	0845

Sample Shipping and Delivery Details

GEL PM: Amanda Rasco
Method of Shipment: FedEx — Date Shipped: 5/11/09
Airbill #:
Airbill #:

For Lab Receiving Use Only
Custody Seal Intact? (YES) NO
Cooler Temp: 20 C

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=N
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY **YELLOW = FILE** **PINK = CLIENT**

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: TETR	**SDG/ARCOC/Work Order:** 229665
Received By: Ricky Albee	**Date Received:** 5/13/09

Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?	✓		Maximum Counts Observed*: 4400 cpm ≈ 0.5 mR/hr
Classified Radioactive II or III by RSO?		✓	
COC/Samples marked containing PCBs?		✓	
Shipped as a DOT Hazardous?	✓		Hazard Class Shipped: 7 UN#: 2910
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?		✓		Preservation Method: ice bags blue ice dry ice (none) other (describe) 20°
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	✓			

Comments: FedEx 8682 9804 4046

PM (or PMA) review: Initials RA Date 5/13/09

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis Report
for

TETR027 Tetra Tech Missouri Project

Client SDG: 229665 GEL Work Order: 229665

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Amanda Rasco.

Amanda J Rasco

Reviewed by

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis

Company : Tetra Tech EM Inc.
Address : 415 Oak Street
Kansas City, Missouri 64106

Report Date: June 1, 2009

Contact: Mr. Robert Monnig
Project: **Standard Products –Ra226**

Client Sample ID:	920–01 0–6"	Project:	TETR02701
Sample ID:	229665001	Client ID:	TETR027
Matrix:	Soil		
Collect Date:	05–MAY–09 09:35		
Receive Date:	12–MAY–09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gamma Spec Analysis											
Gamma, Ra226, Solid "Dry Weight Corrected"											
Radium–226		11.3	+/–0.829	0.0695	0.500	pCi/g		MJH1 05/25/09	1623	867489	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL–RAD–A–021	CXC1	05/14/09	0833	866847

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis

Company : Tetra Tech EM Inc.
Address : 415 Oak Street
Kansas City, Missouri 64106

Report Date: June 1, 2009

Contact: Mr. Robert Monnig
Project: **Standard Products –Ra226**

Client Sample ID:	920–01 6–12"	Project:	TETR02701
Sample ID:	229665002	Client ID:	TETR027
Matrix:	Soil		
Collect Date:	05–MAY–09 09:45		
Receive Date:	12–MAY–09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gamma Spec Analysis											
Gamma, Ra226, Solid "Dry Weight Corrected"											
Radium–226		52.4	+/–4.24	0.112	0.500	pCi/g		MJH1 05/25/09	1623	867489	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL–RAD–A–021	CXC1	05/14/09	0833	866847

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis

Company : Tetra Tech EM Inc.
Address : 415 Oak Street
Kansas City, Missouri 64106

Report Date: June 1, 2009

Contact: Mr. Robert Monnig
Project: **Standard Products –Ra226**

Client Sample ID:	920–02 0–6"	Project:	TETR02701
Sample ID:	229665003	Client ID:	TETR027
Matrix:	Soil		
Collect Date:	05–MAY–09 09:55		
Receive Date:	12–MAY–09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Gamma Spec Analysis											
Gamma, Ra226, Solid "Dry Weight Corrected"											
Radium–226		495	+/–39.6	0.815	0.500	pCi/g		MJH1 05/26/09	0632	867489	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL–RAD–A–021	CXC1	05/14/09	0833	866847

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis

Company : Tetra Tech EM Inc.
Address : 415 Oak Street
Kansas City, Missouri 64106

Report Date: June 1, 2009

Contact: Mr. Robert Monnig
Project: **Standard Products –Ra226**

Client Sample ID:	920–02 6–12"	Project:	TETR02701
Sample ID:	229665004	Client ID:	TETR027
Matrix:	Soil		
Collect Date:	05–MAY–09 10:05		
Receive Date:	12–MAY–09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis												
Gamma, Ra226, Solid "Dry Weight Corrected"												
Radium–226		271	+/–21.3	0.614	0.500	pCi/g		MJH1	05/26/09	0633	867489	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL–RAD–A–021	CXC1	05/14/09	0833	866847

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: June 1, 2009

Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri
Contact: **Mr. Robert Monnig**

Workorder: **229665**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 867489										
QC1201838946 229665001 DUP										
Radium-226		11.3 +/-0.829		10.1 +/-0.918	pCi/g	11.0		(0% - 20%)	MJH1	05/26/09 06:36
QC1201838947 LCS										
Americium-241	16.3			14.6 +/-1.09	pCi/g		89.5	(75%-125%)		05/26/09 06:40
Cesium-137	5.79			6.42 +/-0.579	pCi/g		111	(75%-125%)		
Cobalt-60	7.22			7.66 +/-0.630	pCi/g		106	(75%-125%)		
Radium-226				0.950 +/-0.375	pCi/g			(75%-125%)		
QC1201838945 MB										
Radium-226			U	0.023 +/-0.0701	pCi/g					05/26/09 06:35

Notes:
The Qualifiers in this report are defined as follows:

- ** Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
- BD Results are either below the MDC or tracer recovery is low
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- F Estimated Value
- H Analytical holding time was exceeded
- J Value is estimated
- M M if above MDC and less than LLD
- M Matrix Related Failure
- N/A RPD or %Recovery limits do not apply.
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

QC Summary

Workorder: **229665**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

UI Gamma Spectroscopy--Uncertain identification

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y QC Samples were not spiked with this compound

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

List of current GEL Certifications as of 01 June 2009

State	Certification
Arizona	AZ0668
Arkansas	88–0651
CLIA	42D0904046
California – NELAP	01151CA
Colorado	GEL
Connecticut	PH–0169
Dept. of Navy	NFESC 413
EPA Region 5	WG–15J
Florida – NELAP	E87156
Georgia	E87156 (FL/NELAP)
Georgia DW	967
Hawaii	N/A
ISO 17025	2567.01
Idaho	SC00012
Illinois – NELAP	200029
Indiana	C–SC–01
Kansas – NELAP	E–10332
Kentucky	90129
Louisiana – NELAP	03046
Maryland	270
Massachusetts	M–SC012
Nevada	SC00012
New Jersey – NELAP	SC002
New Mexico	FL NELAP E87156
New York – NELAP	11501
North Carolina	233
North Carolina DW	45709
Oklahoma	9904
Pennsylvania – NELAP	68–00485
South Carolina	10120001/10120002
Tennessee	TN 02934
Texas – NELAP	T104704235–07B–TX
U.S. Dept. of Agriculture	S–52597
Utah – NELAP	GEL
Vermont	VT87156
Virginia	00151
Washington	C1641

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
GAMMA ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #0900021

Project: Region 7 - Kansas Radium Dial Site, Wichita, KS
Analysis Procedure: Gamma Spectrometry
Report ID: 0900021-GAMMA
Report Type: Original
Date Reported: 05/14/2009
Total Pages in Report:

SAMPLES

NAREL Sample #	Client Sample ID	Type	Matrix	Date Collected	Date Received
A9.02906E	650-SB-BG1 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02907F	650-SB-BG2 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02908G	650-SB-7-2 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02909H	650-SB-10-1 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02910A	650-SB-10-1 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02911B	650-SB-13-1 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02912C	650-SB-13-1 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02913D	650-SB-13-2 (0-3.5 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02914E	650-SB-13-2 (3.5-4 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02915F	650-SB-13-3 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02916G	650-SB-13-3 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02917H	650-SB-13-3 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02918J	650-SB-17-1 (0-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02919K	650-SB-17-1 (3-4 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02920C	650-SS-9-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02921D	650-SS-12-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02922E	650-SS-23-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02923F	650-SS-24-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02924G	650-SS-BGA	SAM	SOIL	03/26/2009	04/02/2009
A9.02925H	650-SS-BGB	SAM	SOIL	03/26/2009	04/02/2009

EXCEPTIONS

1. Packaging and Shipping - No problems were observed.
2. Documentation - No problems were observed.
3. Sample Preparation - No problems were encountered.
4. Analysis - No problems were encountered.
5. Holding Times - All holding times were met.

QUALITY CONTROL

1. QC samples - All QC analysis results met NAREL acceptance criteria.
2. Instruments - Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary F. Wisdom — Date: 5-19-09
Quality Assurance Manager, NAREL

John G. Griggs, Ph.D. — Date: 5/26/09
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Method blank

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the *Z* score is computed.

Each standard uncertainty used to compute a *Z* score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

GENERAL INFORMATION (CONTINUED)

GAMMA ANALYSIS

The reporting format lists the gamma emitters in alphabetical order. The activity and 2-sigma uncertainty for radionuclides measured by gamma spectroscopy are reported only if the nuclide is detected. Nuclides that are not detected do not appear in the report, with the exception of Ba-140, Co-60, Cs-137, I-131, K-40, Ra-226 and Ra-228. If one of these seven nuclides is undetected, NAREL reports it as "Not Detected" or "ND", and provides a sample-specific estimate of the MDC.

Due to potential spectral interferences and other possible problems associated with the determination of the activity of certain radionuclides, the activities for Bi-214, Pb-214, Th-234, Pa-234m, Ra-226, Th-231, and U-235 are subject to greater possible uncertainty than other commonly reported radionuclides. It should be noted that this potential uncertainty is not included in the two-sigma counting uncertainty which is reported with each activity. Although in this report we do provide the calculated activities for these radionuclides, we recommend that the results be used only as a qualitative means of indicating the presence of these radionuclides and not as a quantitative measure of their concentration. The results for these nuclides are not used in the evaluation of quality control samples. Furthermore, because of mutual interference between Ra-226 and U-235, NAREL's gamma analysis software tends to overestimate the amounts of these nuclides whenever both are present in a sample. Lower estimates for Ra-226 activities can be obtained from the reported activities of its decay products, Pb-214 and Bi-214, which are likely to be somewhat less than the Ra-226 activity because of the potential escape of radon gas.

NAREL's gamma spectroscopy software corrects activities and MDCs for decay between collection and analysis, but only up to a limit of ten half-lives. So, if the decay time for a sample is more than ten half-lives of a radionuclide, that nuclide will almost always be undetected and the reported MDC will be meaningless. This is usually a problem only for short-lived radionuclides, such as I-131 and Ba-140, when there is a long delay between collection and analysis.

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

ANALYSIS SUMMARY

Analysis Procedure: NAREL GAM-01
Title: Gamma Spectrometry

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
A9.02906E		N/A	05/05/2009	0013224J	0005750W
A9.02906E	DUP	N/A	05/06/2009	0013224J	0005750W
A9.02907F		N/A	05/05/2009	0013224J	0005750W
A9.02908G		N/A	05/05/2009	0013224J	0005750W
A9.02909H		N/A	05/04/2009	0013224J	0005750W
A9.02910A		N/A	05/05/2009	0013224J	0005750W
A9.02911B		N/A	05/05/2009	0013224J	0005750W
A9.02912C		N/A	05/07/2009	0013224J	0005750W
A9.02913D		N/A	05/13/2009	0013224J	0005750W
A9.02914E		N/A	05/13/2009	0013224J	0005750W
A9.02915F		N/A	05/13/2009	0013224J	0005750W
A9.02916G		N/A	05/13/2009	0013224J	0005750W
A9.02917H		N/A	05/05/2009	0013224J	0005750W
A9.02918J		N/A	05/13/2009	0013224J	0005750W
A9.02919K		N/A	05/05/2009	0013224J	0005750W
A9.02920C		N/A	05/05/2009	0013224J	0005750W
A9.02921D		N/A	05/06/2009	0013224J	0005750W
A9.02922E		N/A	05/14/2009	0013224J	0005750W
A9.02923F		N/A	05/13/2009	0013224J	0005750W
A9.02924G		N/A	05/05/2009	0013224J	0005750W
A9.02925H		N/A	05/14/2009	0013224J	0005750W
LCS-00559857U *	LCS	N/A	05/14/2009	0013224J	0005750W
RBK-00559856T *	RBK	N/A	05/14/2009	0013224J	0005750W

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

PREPARATION METHOD(S) USED

Procedure ID	Title

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02906E	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	4.190e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	82.52 %	Analyst:	RCL
Ash/dry weight:	95.20 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 16:25	1000.0	GE01	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		7.9e-01	PCI/GDRY	03/26/2009
Bi212		1.40e+00	2.4e-01		PCI/GDRY	03/26/2009
Bi214	*	1.24e+00	1.5e-01		PCI/GDRY	03/26/2009
Co60		ND		3.5e-02	PCI/GDRY	03/26/2009
Cs137		ND		3.1e-02	PCI/GDRY	03/26/2009
I131		ND		6.6e-01	PCI/GDRY	03/26/2009
K40		2.07e+01	2.4e+00		PCI/GDRY	03/26/2009
Pb212		1.49e+00	1.8e-01		PCI/GDRY	03/26/2009
Pb214	*	1.34e+00	1.6e-01		PCI/GDRY	03/26/2009
Ra223	*	4.13e-01	8.3e-02		PCI/GDRY	03/26/2009
Ra224		1.22e+00	3.6e-01		PCI/GDRY	03/26/2009
Ra226	*	2.29e+00	4.0e-01		PCI/GDRY	03/26/2009
Ra228		1.45e+00	1.8e-01		PCI/GDRY	03/26/2009
Tl208		4.98e-01	6.1e-02		PCI/GDRY	03/26/2009
U235	*	1.44e-01	2.5e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02906E	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	4.190e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	82.52 %	Analyst:	RCL
Ash/dry weight:	95.20 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 16:23	1000.0	GE06	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		6.3e-01	PCI/GDRY	03/26/2009
Bi212		1.48e+00	2.2e-01		PCI/GDRY	03/26/2009
Bi214	*	1.26e+00	1.5e-01		PCI/GDRY	03/26/2009
Co60		ND		2.8e-02	PCI/GDRY	03/26/2009
Cs137		ND		2.4e-02	PCI/GDRY	03/26/2009
I131		ND		6.3e-01	PCI/GDRY	03/26/2009
K40		2.19e+01	2.5e+00		PCI/GDRY	03/26/2009
Pb212		1.44e+00	1.7e-01		PCI/GDRY	03/26/2009
Pb214	*	1.37e+00	1.6e-01		PCI/GDRY	03/26/2009
Ra223	*	3.39e-01	6.8e-02		PCI/GDRY	03/26/2009
Ra224		9.00e-01	3.0e-01		PCI/GDRY	03/26/2009
Ra226	*	2.26e+00	3.7e-01		PCI/GDRY	03/26/2009
Ra228		1.51e+00	1.8e-01		PCI/GDRY	03/26/2009
Th234	*	8.76e-01	2.3e-01		PCI/GDRY	03/26/2009
Tl208		4.81e-01	5.9e-02		PCI/GDRY	03/26/2009
U235	*	1.39e-01	2.3e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02907F	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	4.830e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	84.22 %	Analyst:	RCL
Ash/dry weight:	95.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 16:25	1000.0	GE06	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		5.3e-01	PCI/GDRY	03/26/2009
Bi212		1.30e+00	2.1e-01		PCI/GDRY	03/26/2009
Bi214	*	1.13e+00	1.3e-01		PCI/GDRY	03/26/2009
Co60		ND		2.5e-02	PCI/GDRY	03/26/2009
Cs137		ND		2.1e-02	PCI/GDRY	03/26/2009
I131		ND		4.9e-01	PCI/GDRY	03/26/2009
K40		2.00e+01	2.3e+00		PCI/GDRY	03/26/2009
Pb212		1.31e+00	1.5e-01		PCI/GDRY	03/26/2009
Pb214	*	1.19e+00	1.4e-01		PCI/GDRY	03/26/2009
Ra223	*	3.16e-01	6.3e-02		PCI/GDRY	03/26/2009
Ra224		9.33e-01	2.8e-01		PCI/GDRY	03/26/2009
Ra226	*	1.99e+00	3.3e-01		PCI/GDRY	03/26/2009
Ra228		1.33e+00	1.6e-01		PCI/GDRY	03/26/2009
Th234	*	8.80e-01	2.4e-01		PCI/GDRY	03/26/2009
Tl208		4.30e-01	5.2e-02		PCI/GDRY	03/26/2009
U235	*	1.24e-01	2.0e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02908G	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.880e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	93.71 %	Analyst:	RCL
Ash/dry weight:	92.40 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 16:06	500.0	GE13	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		1.2e+00	PCI/GDRY	03/26/2009
Bi212		6.01e-01	2.8e-01		PCI/GDRY	03/26/2009
Bi214	*	9.14e+00	1.1e+00		PCI/GDRY	03/26/2009
Co60		ND		4.4e-02	PCI/GDRY	03/26/2009
Cs137		9.73e-02	2.6e-02		PCI/GDRY	03/26/2009
I131		ND		1.1e+00	PCI/GDRY	03/26/2009
K40		1.23e+01	1.5e+00		PCI/GDRY	03/26/2009
Pb212		5.49e-01	8.4e-02		PCI/GDRY	03/26/2009
Pb214	*	9.82e+00	1.1e+00		PCI/GDRY	03/26/2009
Ra223	*	1.76e-01	1.5e-01		PCI/GDRY	03/26/2009
Ra224		8.16e-01	6.6e-01		PCI/GDRY	03/26/2009
Ra226	*	1.33e+01	1.6e+00		PCI/GDRY	03/26/2009
Ra228		5.35e-01	8.9e-02		PCI/GDRY	03/26/2009
Tl208		1.76e-01	3.2e-02		PCI/GDRY	03/26/2009
U235	*	8.35e-01	1.0e-01		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02909H	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	5.900e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	91.62 %	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 12:09	300.0	GE14	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		7.9e-01	PCI/GDRY	03/26/2009
Bi212		8.18e-01	1.8e-01		PCI/GDRY	03/26/2009
Bi214	*	4.90e+00	5.7e-01		PCI/GDRY	03/26/2009
Co60		ND		2.8e-02	PCI/GDRY	03/26/2009
Cs137		1.37e-02	9.8e-03		PCI/GDRY	03/26/2009
I131		ND		7.9e-01	PCI/GDRY	03/26/2009
K40		2.10e+01	2.4e+00		PCI/GDRY	03/26/2009
Pb212		7.12e-01	8.9e-02		PCI/GDRY	03/26/2009
Pb214	*	5.28e+00	6.1e-01		PCI/GDRY	03/26/2009
Ra223	*	9.41e-02	9.1e-02		PCI/GDRY	03/26/2009
Ra224		4.40e-01	3.9e-01		PCI/GDRY	03/26/2009
Ra226	*	6.89e+00	8.9e-01		PCI/GDRY	03/26/2009
Ra228		7.46e-01	9.7e-02		PCI/GDRY	03/26/2009
Tl208		2.29e-01	3.1e-02		PCI/GDRY	03/26/2009
U235	*	4.32e-01	5.6e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02910A	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	5.020e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	87.59 %	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 16:25	1000.0	GE07	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		5.6e-01	PCI/GDRY	03/26/2009
Bi212		1.07e+00	2.0e-01		PCI/GDRY	03/26/2009
Bi214	*	1.12e+00	1.3e-01		PCI/GDRY	03/26/2009
Co60		ND		2.5e-02	PCI/GDRY	03/26/2009
Cs137		2.23e-02	1.0e-02		PCI/GDRY	03/26/2009
I131		ND		5.4e-01	PCI/GDRY	03/26/2009
K40		1.85e+01	2.2e+00		PCI/GDRY	03/26/2009
Pb212		1.05e+00	1.2e-01		PCI/GDRY	03/26/2009
Pb214	*	1.17e+00	1.4e-01		PCI/GDRY	03/26/2009
Ra223	*	2.38e-01	5.7e-02		PCI/GDRY	03/26/2009
Ra224		5.32e-01	2.8e-01		PCI/GDRY	03/26/2009
Ra226		ND		3.8e-01	PCI/GDRY	03/26/2009
Ra228		1.07e+00	1.3e-01		PCI/GDRY	03/26/2009
Th234	*	1.21e+00	2.4e-01		PCI/GDRY	03/26/2009
Tl208		3.49e-01	4.3e-02		PCI/GDRY	03/26/2009
U235	*	1.12e-01	2.0e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02911B	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.860e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	89.17 %	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 16:25	1000.0	GE09	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		1.3e+00	PCI/GDRY	03/26/2009
Bi212		6.56e-01	2.5e-01		PCI/GDRY	03/26/2009
Bi214	*	1.43e+01	1.6e+00		PCI/GDRY	03/26/2009
Co60		ND		5.0e-02	PCI/GDRY	03/26/2009
Cs137		5.29e-02	2.4e-02		PCI/GDRY	03/26/2009
I131		ND		1.3e+00	PCI/GDRY	03/26/2009
K40		1.16e+01	1.4e+00		PCI/GDRY	03/26/2009
Pb212		6.73e-01	9.0e-02		PCI/GDRY	03/26/2009
Pb214	*	1.53e+01	1.8e+00		PCI/GDRY	03/26/2009
Ra223	*	3.95e-01	1.7e-01		PCI/GDRY	03/26/2009
Ra224		1.59e+00	5.9e-01		PCI/GDRY	03/26/2009
Ra226	*	2.04e+01	2.4e+00		PCI/GDRY	03/26/2009
Ra228		6.37e-01	9.9e-02		PCI/GDRY	03/26/2009
Th234	*	1.30e+00	3.5e-01		PCI/GDRY	03/26/2009
Tl208		2.26e-01	3.5e-02		PCI/GDRY	03/26/2009
U235	*	1.24e+00	1.5e-01		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02912C	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.230e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	84.37 %	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/06/2009 15:48	1000.0	GE08	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		1.2e+00	PCI/GDRY	03/26/2009
Bi212		1.11e+00	2.7e-01		PCI/GDRY	03/26/2009
Bi214	*	4.87e+00	5.7e-01		PCI/GDRY	03/26/2009
Co60		ND		5.4e-02	PCI/GDRY	03/26/2009
Cs137		ND		3.9e-02	PCI/GDRY	03/26/2009
I131		ND		1.1e+00	PCI/GDRY	03/26/2009
K40		7.85e+00	9.9e-01		PCI/GDRY	03/26/2009
Pb210	*	4.17e+00	6.3e-01		PCI/GDRY	03/26/2009
Pb212		9.04e-01	1.1e-01		PCI/GDRY	03/26/2009
Pb214	*	5.13e+00	5.9e-01		PCI/GDRY	03/26/2009
Ra223	*	4.90e-01	1.1e-01		PCI/GDRY	03/26/2009
Ra224		1.01e+00	4.8e-01		PCI/GDRY	03/26/2009
Ra226	*	5.14e+00	7.4e-01		PCI/GDRY	03/26/2009
Ra228		8.78e-01	1.3e-01		PCI/GDRY	03/26/2009
Th227		2.36e-01	9.9e-02		PCI/GDRY	03/26/2009
Th234	*	3.78e+00	4.9e-01		PCI/GDRY	03/26/2009
Tl208		3.06e-01	4.4e-02		PCI/GDRY	03/26/2009
U235	*	2.45e-01	3.9e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02913D	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.180e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	84.24 %	Analyst:	RCL
Ash/dry weight:	94.80 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 13:20	100.0	GE08	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		2.7e+01	PCI/GDRY	03/26/2009
Bi214	*	2.41e+02	2.8e+01		PCI/GDRY	03/26/2009
Co60		ND		8.3e-01	PCI/GDRY	03/26/2009
Cs137		ND		7.6e-01	PCI/GDRY	03/26/2009
I131		ND		3.3e+01	PCI/GDRY	03/26/2009
K40		1.58e+01	4.1e+00		PCI/GDRY	03/26/2009
Pb210	*	1.60e+02	1.9e+01		PCI/GDRY	03/26/2009
Pb212		8.05e-01	4.6e-01		PCI/GDRY	03/26/2009
Pb214	*	2.47e+02	2.8e+01		PCI/GDRY	03/26/2009
Ra224		1.61e+01	8.1e+00		PCI/GDRY	03/26/2009
Ra226	*	3.02e+02	3.6e+01		PCI/GDRY	03/26/2009
Ra228		ND		5.4e+00	PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02914E	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.690e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	76.22 %	Analyst:	RCL
Ash/dry weight:	94.80 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 14:59	100.0	GE13	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		3.6e+00	PCI/GDRY	03/26/2009
Bi212		1.63e+00	5.8e-01		PCI/GDRY	03/26/2009
Bi214	*	1.04e+00	1.6e-01		PCI/GDRY	03/26/2009
Co60		ND		6.1e-02	PCI/GDRY	03/26/2009
Cs137		ND		9.5e-02	PCI/GDRY	03/26/2009
I131		ND		4.3e+00	PCI/GDRY	03/26/2009
K40		1.89e+01	2.5e+00		PCI/GDRY	03/26/2009
Pb212		1.52e+00	2.1e-01		PCI/GDRY	03/26/2009
Pb214	*	1.29e+00	1.8e-01		PCI/GDRY	03/26/2009
Ra226	*	1.70e+00	9.5e-01		PCI/GDRY	03/26/2009
Ra228		1.51e+00	2.3e-01		PCI/GDRY	03/26/2009
Tl208		4.89e-01	8.0e-02		PCI/GDRY	03/26/2009
U235	*	1.07e-01	6.0e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02915F	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.670e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	86.33 %	Analyst:	RCL
Ash/dry weight:	92.40 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:41	100.0	GE13	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		1.6e+01	PCI/GDRY	03/26/2009
Bi214	*	1.33e+02	1.5e+01		PCI/GDRY	03/26/2009
Co60		ND		4.0e-01	PCI/GDRY	03/26/2009
Cs137		ND		4.1e-01	PCI/GDRY	03/26/2009
I131		ND		1.9e+01	PCI/GDRY	03/26/2009
K40		1.16e+01	2.3e+00		PCI/GDRY	03/26/2009
Pb212		9.46e-01	4.3e-01		PCI/GDRY	03/26/2009
Pb214	*	1.42e+02	1.6e+01		PCI/GDRY	03/26/2009
Ra224		9.66e+00	4.9e+00		PCI/GDRY	03/26/2009
Ra226	*	1.87e+02	2.2e+01		PCI/GDRY	03/26/2009
Ra228		ND		2.7e+00	PCI/GDRY	03/26/2009
Tl208		2.24e-01	1.4e-01		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02916G	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.710e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	82.50 %	Analyst:	RCL
Ash/dry weight:	90.40 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 18:23	100.0	GE13	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		5.3e+00	PCI/GDRY	03/26/2009
Bi212		1.45e+00	8.1e-01		PCI/GDRY	03/26/2009
Bi214	*	9.99e+00	1.2e+00		PCI/GDRY	03/26/2009
Co60		ND		1.3e-01	PCI/GDRY	03/26/2009
Cs137		4.90e-02	5.3e-02		PCI/GDRY	03/26/2009
I131		ND		6.4e+00	PCI/GDRY	03/26/2009
K40		1.66e+01	2.2e+00		PCI/GDRY	03/26/2009
Pb212		1.04e+00	1.7e-01		PCI/GDRY	03/26/2009
Pb214	*	1.05e+01	1.2e+00		PCI/GDRY	03/26/2009
Ra223	*	6.04e-01	5.2e-01		PCI/GDRY	03/26/2009
Ra224		1.21e+00	1.5e+00		PCI/GDRY	03/26/2009
Ra226	*	1.57e+01	2.3e+00		PCI/GDRY	03/26/2009
Ra228		1.09e+00	2.2e-01		PCI/GDRY	03/26/2009
Tl208		3.18e-01	7.3e-02		PCI/GDRY	03/26/2009
U235	*	9.83e-01	1.4e-01		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02917H	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	4.540e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	80.07 %	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 16:25	1000.0	GE15	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		5.9e-01	PCI/GDRY	03/26/2009
Bi212		1.65e+00	2.4e-01		PCI/GDRY	03/26/2009
Bi214	*	1.23e+00	1.4e-01		PCI/GDRY	03/26/2009
Co60		ND		2.4e-02	PCI/GDRY	03/26/2009
Cs137		ND		2.3e-02	PCI/GDRY	03/26/2009
I131		ND		5.6e-01	PCI/GDRY	03/26/2009
K40		2.20e+01	2.5e+00		PCI/GDRY	03/26/2009
Pb210	*	7.73e-01	2.2e-01		PCI/GDRY	03/26/2009
Pb212		1.17e+00	1.4e-01		PCI/GDRY	03/26/2009
Pb214	*	1.25e+00	1.5e-01		PCI/GDRY	03/26/2009
Ra226	*	2.31e+00	3.6e-01		PCI/GDRY	03/26/2009
Ra228		1.47e+00	1.7e-01		PCI/GDRY	03/26/2009
Th234	*	6.63e-01	1.4e-01		PCI/GDRY	03/26/2009
Tl208		4.84e-01	5.7e-02		PCI/GDRY	03/26/2009
U235	*	1.42e-01	2.2e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02918J	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.700e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	84.34 %	Analyst:	RCL
Ash/dry weight:	94.80 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 20:05	100.0	GE13	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		1.8e+01	PCI/GDRY	03/26/2009
Bi214	*	1.67e+02	1.9e+01		PCI/GDRY	03/26/2009
Co60		ND		4.0e-01	PCI/GDRY	03/26/2009
Cs137		ND		4.5e-01	PCI/GDRY	03/26/2009
I131		ND		2.2e+01	PCI/GDRY	03/26/2009
K40		1.88e+01	2.9e+00		PCI/GDRY	03/26/2009
Pb212		9.45e-01	3.7e-01		PCI/GDRY	03/26/2009
Pb214	*	1.80e+02	2.1e+01		PCI/GDRY	03/26/2009
Ra224		7.50e+00	5.6e+00		PCI/GDRY	03/26/2009
Ra226	*	3.02e+02	3.5e+01		PCI/GDRY	03/26/2009
Ra228		ND		3.0e+00	PCI/GDRY	03/26/2009
Tl208		1.73e-01	1.4e-01		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02919K	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	4.110e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	80.95 %	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 16:25	1000.0	GE16	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		4.5e-01	PCI/GDRY	03/26/2009
Bi212		1.51e+00	2.1e-01		PCI/GDRY	03/26/2009
Bi214	*	1.54e+00	1.8e-01		PCI/GDRY	03/26/2009
Co60		ND		2.1e-02	PCI/GDRY	03/26/2009
Cs137		ND		1.8e-02	PCI/GDRY	03/26/2009
I131		ND		4.3e-01	PCI/GDRY	03/26/2009
K40		2.30e+01	2.7e+00		PCI/GDRY	03/26/2009
Pb210	*	1.60e+00	2.5e-01		PCI/GDRY	03/26/2009
Pb212		1.03e+00	1.2e-01		PCI/GDRY	03/26/2009
Pb214	*	1.64e+00	1.9e-01		PCI/GDRY	03/26/2009
Ra226	*	2.75e+00	3.8e-01		PCI/GDRY	03/26/2009
Ra228		1.45e+00	1.7e-01		PCI/GDRY	03/26/2009
Th234	*	7.12e-01	1.2e-01		PCI/GDRY	03/26/2009
Tl208		4.72e-01	5.6e-02		PCI/GDRY	03/26/2009
U235	*	1.72e-01	2.4e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02920C	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.850e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	89.49 %	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 00:28	500.0	GE13	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		1.1e+00	PCI/GDRY	03/26/2009
Bi212		1.13e+00	3.0e-01		PCI/GDRY	03/26/2009
Bi214	*	6.90e+00	8.0e-01		PCI/GDRY	03/26/2009
Co60		ND		4.0e-02	PCI/GDRY	03/26/2009
Cs137		ND		4.5e-02	PCI/GDRY	03/26/2009
I131		ND		1.1e+00	PCI/GDRY	03/26/2009
K40		1.96e+01	2.3e+00		PCI/GDRY	03/26/2009
Pb212		8.15e-01	1.1e-01		PCI/GDRY	03/26/2009
Pb214	*	7.44e+00	8.6e-01		PCI/GDRY	03/26/2009
Ra223	*	2.08e-01	1.6e-01		PCI/GDRY	03/26/2009
Ra224		1.15e+00	6.1e-01		PCI/GDRY	03/26/2009
Ra226	*	1.06e+01	1.3e+00		PCI/GDRY	03/26/2009
Ra228		8.14e-01	1.2e-01		PCI/GDRY	03/26/2009
Tl208		2.69e-01	4.0e-02		PCI/GDRY	03/26/2009
U235	*	6.66e-01	8.4e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02921D	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.540e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	91.74 %	Analyst:	RCL
Ash/dry weight:	96.00 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 16:24	1000.0	GE08	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		7.1e-01	PCI/GDRY	03/26/2009
Bi212		7.69e-01	2.0e-01		PCI/GDRY	03/26/2009
Bi214	*	7.78e-01	9.8e-02		PCI/GDRY	03/26/2009
Co60		ND		3.9e-02	PCI/GDRY	03/26/2009
Cs137		2.54e-01	3.5e-02		PCI/GDRY	03/26/2009
I131		ND		7.2e-01	PCI/GDRY	03/26/2009
K40		1.70e+01	2.0e+00		PCI/GDRY	03/26/2009
Pb210	*	2.00e+00	3.7e-01		PCI/GDRY	03/26/2009
Pb212		6.91e-01	8.6e-02		PCI/GDRY	03/26/2009
Pb214	*	8.28e-01	1.0e-01		PCI/GDRY	03/26/2009
Ra224		7.49e-01	3.5e-01		PCI/GDRY	03/26/2009
Ra226	*	1.49e+00	3.4e-01		PCI/GDRY	03/26/2009
Ra228		7.42e-01	1.0e-01		PCI/GDRY	03/26/2009
Th234	*	5.67e-01	1.5e-01		PCI/GDRY	03/26/2009
Tl208		2.24e-01	3.3e-02		PCI/GDRY	03/26/2009
U235	*	9.36e-02	2.1e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02922E	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.520e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	86.03 %	Analyst:	RCL
Ash/dry weight:	89.20 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 10:12	100.0	GE08	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		7.4e+00	PCI/GDRY	03/26/2009
Bi214	*	1.59e+01	1.9e+00		PCI/GDRY	03/26/2009
Co60		ND		2.3e-01	PCI/GDRY	03/26/2009
Cs137		2.36e-01	9.2e-02		PCI/GDRY	03/26/2009
I131		ND		9.8e+00	PCI/GDRY	03/26/2009
K40		1.71e+01	2.5e+00		PCI/GDRY	03/26/2009
Pb210	*	8.06e+00	1.8e+00		PCI/GDRY	03/26/2009
Pb212		7.17e-01	1.7e-01		PCI/GDRY	03/26/2009
Pb214	*	1.62e+01	1.9e+00		PCI/GDRY	03/26/2009
Ra226	*	2.01e+01	3.0e+00		PCI/GDRY	03/26/2009
Ra228		5.95e-01	2.9e-01		PCI/GDRY	03/26/2009
Tl208		1.05e-01	7.8e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02923F	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.630e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	86.97 %	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 15:19	300.0	GE14	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		2.0e+00	PCI/GDRY	03/26/2009
Bi212		4.89e-01	2.4e-01		PCI/GDRY	03/26/2009
Bi214	*	5.74e+00	6.7e-01		PCI/GDRY	03/26/2009
Co60		ND		4.6e-02	PCI/GDRY	03/26/2009
Cs137		2.40e-01	3.6e-02		PCI/GDRY	03/26/2009
I131		ND		2.4e+00	PCI/GDRY	03/26/2009
K40		1.92e+01	2.3e+00		PCI/GDRY	03/26/2009
Pb212		5.62e-01	8.0e-02		PCI/GDRY	03/26/2009
Pb214	*	6.12e+00	7.1e-01		PCI/GDRY	03/26/2009
Ra223	*	1.23e-01	9.8e-02		PCI/GDRY	03/26/2009
Ra224		9.31e-01	5.5e-01		PCI/GDRY	03/26/2009
Ra226	*	8.92e+00	1.1e+00		PCI/GDRY	03/26/2009
Ra228		5.91e-01	9.3e-02		PCI/GDRY	03/26/2009
Tl208		1.29e-01	2.8e-02		PCI/GDRY	03/26/2009
U235	*	5.60e-01	7.2e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02924G	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.580e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	86.84 %	Analyst:	RCL
Ash/dry weight:	91.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/04/2009 16:25	1000.0	GE08	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		7.6e-01	PCI/GDRY	03/26/2009
Bi212		7.78e-01	2.4e-01		PCI/GDRY	03/26/2009
Bi214	*	1.72e+00	2.0e-01		PCI/GDRY	03/26/2009
Co60		ND		4.3e-02	PCI/GDRY	03/26/2009
Cs137		1.60e-01	2.5e-02		PCI/GDRY	03/26/2009
I131		ND		7.2e-01	PCI/GDRY	03/26/2009
K40		1.87e+01	2.2e+00		PCI/GDRY	03/26/2009
Pb210	*	2.00e+00	3.9e-01		PCI/GDRY	03/26/2009
Pb212		7.31e-01	9.1e-02		PCI/GDRY	03/26/2009
Pb214	*	1.79e+00	2.1e-01		PCI/GDRY	03/26/2009
Ra223	*	1.96e-01	7.3e-02		PCI/GDRY	03/26/2009
Ra224		8.76e-01	3.6e-01		PCI/GDRY	03/26/2009
Ra226	*	2.81e+00	4.7e-01		PCI/GDRY	03/26/2009
Ra228		7.51e-01	1.0e-01		PCI/GDRY	03/26/2009
Th234	*	3.60e-01	1.5e-01		PCI/GDRY	03/26/2009
Tl208		2.38e-01	3.5e-02		PCI/GDRY	03/26/2009
U235	*	1.77e-01	3.0e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02925H	QC batch #:	0005750W
Matrix:	SOIL	Assay batch #:	0013224J
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.540e+02 GDRY	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	79.85 %	Analyst:	RCL
Ash/dry weight:	87.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 15:37	1000.0	GE08	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140		ND		1.1e+00	PCI/GDRY	03/26/2009
Bi212		6.79e-01	1.9e-01		PCI/GDRY	03/26/2009
Bi214	*	8.20e-01	1.0e-01		PCI/GDRY	03/26/2009
Co60		ND		3.7e-02	PCI/GDRY	03/26/2009
Cs137		2.54e-01	3.5e-02		PCI/GDRY	03/26/2009
I131		ND		1.4e+00	PCI/GDRY	03/26/2009
K40		1.67e+01	2.0e+00		PCI/GDRY	03/26/2009
Pb210	*	2.00e+00	3.7e-01		PCI/GDRY	03/26/2009
Pb212		7.33e-01	9.0e-02		PCI/GDRY	03/26/2009
Pb214	*	8.24e-01	1.0e-01		PCI/GDRY	03/26/2009
Ra223	*	2.30e-01	6.3e-02		PCI/GDRY	03/26/2009
Ra224		5.92e-01	3.3e-01		PCI/GDRY	03/26/2009
Ra226	*	1.43e+00	3.2e-01		PCI/GDRY	03/26/2009
Ra228		7.53e-01	1.0e-01		PCI/GDRY	03/26/2009
Th234	*	4.10e-01	1.4e-01		PCI/GDRY	03/26/2009
Tl208		2.38e-01	3.4e-02		PCI/GDRY	03/26/2009
U235	*	9.03e-02	2.0e-02		PCI/GDRY	03/26/2009

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	LCS-00559857U	QC batch #:	0005750W
Matrix:	N/A	Assay batch #:	0013224J
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 15:37	1000.0	GE15	RCL

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba133		9.49e+01	1.2e+01		PCI	11/01/2006
Ba140		ND		1.9e+04	PCI	11/01/2006
Co60		7.71e+01	9.4e+00		PCI	11/01/2006
Cs137		1.29e+02	1.5e+01		PCI	11/01/2006
Eu152		1.04e+02	1.4e+01		PCI	11/01/2006
I131		ND		5.0e+03	PCI	11/01/2006
K40		ND		5.4e+01	PCI	11/01/2006
Pb210	*	2.66e+02	8.8e+01		PCI	11/01/2006
Pb212		7.32e+00	8.2e+00		PCI	11/01/2006
Ra226		ND		1.2e+02	PCI	11/01/2006
Ra228		ND		7.0e+01	PCI	11/01/2006

* An asterisk indicates a result that may be significantly under or overestimated

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	RBK-00559856T	QC batch #:	0005750W
Matrix:	N/A	Assay batch #:	0013224J
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	RCL
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 15:37	1000.0	GE16	RCL

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Ba140	ND		1.5e+01	PCI	05/04/2009
Co60	ND		3.7e+00	PCI	05/04/2009
Cs137	ND		3.1e+00	PCI	05/04/2009
I131	ND		6.5e+00	PCI	05/04/2009
K40	1.88e+01	1.4e+01		PCI	05/04/2009
Ra226	ND		5.1e+01	PCI	05/04/2009
Ra228	ND		2.0e+01	PCI	05/04/2009

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG 0900021

QC BATCH SUMMARY

QC batch #: 0005750W
Preparation procedure: N/A
Analysis procedure: NAREL GAM-01

NAREL Sample #	QC Type	Yield (%)	± 2 σ Uncertainty (%)	Analyst
A9.02906E		N/A		RCL
A9.02906E	DUP	N/A		RCL
A9.02907F		N/A		RCL
A9.02908G		N/A		RCL
A9.02909H		N/A		RCL
A9.02910A		N/A		RCL
A9.02911B		N/A		RCL
A9.02912C		N/A		RCL
A9.02913D		N/A		RCL
A9.02914E		N/A		RCL
A9.02915F		N/A		RCL
A9.02916G		N/A		RCL
A9.02917H		N/A		RCL
A9.02918J		N/A		RCL
A9.02919K		N/A		RCL
A9.02920C		N/A		RCL
A9.02921D		N/A		RCL
A9.02922E		N/A		RCL
A9.02923F		N/A		RCL
A9.02924G		N/A		RCL
A9.02925H		N/A		RCL
LCS-00559857U *	LCS	N/A		RCL
RBK-00559856T *	RBK	N/A		RCL

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0005750W Analytical Procedure: NAREL GAM-01

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity ± 2σ	Prep Date
00559856T	BA140		
00559856T	CO60		
00559856T	CS137		
00559856T	I131		
00559856T	K40	1.88e+01 ± 1.4e+01	
00559856T	RA226		
00559856T	RA228		

LABORATORY DUPLICATES (PCI/GDRY)

Sample ID	Nuclide	Original ± 2σ	Duplicate ± 2σ	RPD	Z
A9.02906E	BA140				
A9.02906E	BI212	1.40e+00 ± 2.4e-01	1.48e+00 ± 2.2e-01	5.56	0.49 OK
A9.02906E	CO60				
A9.02906E	CS137				
A9.02906E	I131				
A9.02906E	K40	2.07e+01 ± 2.4e+00	2.19e+01 ± 2.5e+00	5.63	0.68 OK
A9.02906E	PB212	1.49e+00 ± 1.8e-01	1.44e+00 ± 1.7e-01	3.41	-0.41 OK
A9.02906E	RA224	1.22e+00 ± 3.6e-01	9.00e-01 ± 3.0e-01	30.19	-1.36 OK
A9.02906E	RA228	1.45e+00 ± 1.8e-01	1.51e+00 ± 1.8e-01	4.05	0.48 OK
A9.02906E	TL208	4.98e-01 ± 6.1e-02	4.81e-01 ± 5.9e-02	3.47	-0.40 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added ± 2σ	Measured ± 2σ	%R	Z
00559857U	BA133	1.04e+02 ± 2.1%	9.49e+01 ± 1.2e+01	91.54	-1.50 OK
00559857U	BA140	NO SPIKE DATA			
00559857U	CO60	7.36e+01 ± 2.1%	7.71e+01 ± 9.4e+00	104.81	0.74 OK
00559857U	CS137	1.16e+02 ± 2.1%	1.29e+02 ± 1.5e+01	111.55	1.70 OK
00559857U	EU152	9.54e+01 ± 2.1%	1.04e+02 ± 1.4e+01	108.96	1.20 OK
00559857U	I131	NO SPIKE DATA			
00559857U	K40	NO SPIKE DATA			
00559857U	PB212	NO SPIKE DATA			
00559857U	RA226	NO SPIKE DATA			
00559857U	RA228	NO SPIKE DATA			

Analyst: Robert Lowry 5-14-09
Lowry, Robert C.

QA Officer: Kirk J. McLean 5/18/09

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
U ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #0900021

Project: Region 7 - Kansas Radium Dial Site, Wichita, KS
Analysis Procedure: Actinides (Uranium) by Extraction Chromatography
Report ID: 0900021-U
Report Type: Original
Date Reported: 05/27/2009
Total Pages in Report: 27

SAMPLES

NAREL Sample #	Client Sample ID	Type	Matrix	Date Collected	Date Received
A9.02906E	650-SB-BG1 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02907F	650-SB-BG2 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02908G	650-SB-7-2 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02909H	650-SB-10-1 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02910A	650-SB-10-1 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02911B	650-SB-13-1 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02912C	650-SB-13-1 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02913D	650-SB-13-2 (0-3.5 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02914E	650-SB-13-2 (3.5-4 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02915F	650-SB-13-3 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02916G	650-SB-13-3 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02917H	650-SB-13-3 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02918J	650-SB-17-1 (0-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02919K	650-SB-17-1 (3-4 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02920C	650-SS-9-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02921D	650-SS-12-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02922E	650-SS-23-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02923F	650-SS-24-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02924G	650-SS-BGA	SAM	SOIL	03/26/2009	04/02/2009
A9.02925H	650-SS-BGB	SAM	SOIL	03/26/2009	04/02/2009

EXCEPTIONS

1. Packaging and Shipping - No problems were observed.
2. Documentation - No problems were observed.
3. Sample Preparation - No problems were encountered.
4. Analysis - Only samples A9.02906, A9.02907, A9.02913, A9.02916, A9.02921, A9.02924, and A9.02925 were analyzed for uranium as requested by the client. For samples A9.02913 and A9.02916, the aliquant size used for these samples was very small in anticipation of elevated analyte concentration. The concentration of uranium present in these samples, however, was not elevated as anticipated. In an effort to provide results with lower uncertainties, samples A9.02913 and A9.02916 were reanalyzed with larger aliquants. The results of the reanalysis of these samples are reported in this data package.
5. Holding Times - All holding times were met.

QUALITY CONTROL

1. QC samples - All QC analysis results met NAREL acceptance criteria.
2. Yields - All chemical yields were within acceptance limits.
3. Instruments - Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 5-28-09

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

John Griggs 5/28/09

John G. Griggs, Ph.D. — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Method blank

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the *Z* score is computed.

Each standard uncertainty used to compute a *Z* score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

ANALYSIS SUMMARY

Analysis Procedure: NAREL U-EICHROM
Title: Actinides (Uranium) by Extraction Chromatography

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
A9.02906E		N/A	05/15/2009	0013258V	0005769H
A9.02906E	DUP	N/A	05/15/2009	0013258V	0005769H
A9.02907F		N/A	05/15/2009	0013258V	0005769H
A9.02913D		N/A	05/21/2009	0013275W	0005792G
A9.02913D	DUP	N/A	05/21/2009	0013275W	0005792G
A9.02916G		N/A	05/21/2009	0013275W	0005792G
A9.02921D		N/A	05/15/2009	0013258V	0005769H
A9.02924G		N/A	05/15/2009	0013258V	0005769H
A9.02925H		N/A	05/15/2009	0013258V	0005769H
LCS-00560089T *	LCS	N/A	05/15/2009	0013258V	0005769H
RBK-00560088R *	RBK	N/A	05/15/2009	0013258V	0005769H
LCS-00560984R *	LCS	N/A	05/21/2009	0013275W	0005792G
RBK-00560983Q *	RBK	N/A	05/21/2009	0013275W	0005792G

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

PREPARATION METHOD(S) USED

Procedure ID	Title

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02906E	QC batch #:	0005769H
Matrix:	SOIL	Assay batch #:	0013258V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.532e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	82.52 %	Analyst:	PMT
Ash/dry weight:	95.20 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 17:05	1000.0	AS02	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	7.22e-01	1.5e-01	4.7e-02	PCI/GDRY	05/14/2009
U235	5.46e-02	5.0e-02	5.7e-02	PCI/GDRY	05/14/2009
U238	7.85e-01	1.6e-01	5.2e-02	PCI/GDRY	05/14/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02906E	QC batch #:	0005769H
Matrix:	SOIL	Assay batch #:	0013258V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.509e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	82.52 %	Analyst:	PMT
Ash/dry weight:	95.20 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 17:05	1000.0	AS09	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	7.71e-01	1.6e-01	4.3e-02	PCI/GDRY	05/14/2009
U235	4.54e-02	4.5e-02	3.9e-02	PCI/GDRY	05/14/2009
U238	7.41e-01	1.6e-01	4.3e-02	PCI/GDRY	05/14/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02907F	QC batch #:	0005769H
Matrix:	SOIL	Assay batch #:	0013258V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.537e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	84.22 %	Analyst:	PMT
Ash/dry weight:	95.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 17:05	1000.0	AS10	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	6.82e-01	1.5e-01	4.8e-02	PCI/GDRY	05/14/2009
U235	1.77e-02	3.7e-02	6.4e-02	PCI/GDRY	05/14/2009
U238	7.10e-01	1.5e-01	3.2e-02	PCI/GDRY	05/14/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02913D	QC batch #:	0005792G
Matrix:	SOIL	Assay batch #:	0013275W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.014e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	84.24 %	Analyst:	PMT
Ash/dry weight:	94.80 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 17:04	1000.0	AS26	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	1.01e+00	2.1e-01	4.4e-02	PCI/GDRY	05/20/2009
U235	3.37e-02	4.2e-02	5.3e-02	PCI/GDRY	05/20/2009
U238	9.91e-01	2.1e-01	3.3e-02	PCI/GDRY	05/20/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02913D	QC batch #:	0005792G
Matrix:	SOIL	Assay batch #:	0013275W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.014e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	84.24 %	Analyst:	PMT
Ash/dry weight:	94.80 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 17:04	1000.0	AS28	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	1.14e+00	2.2e-01	4.8e-02	PCI/GDRY	05/20/2009
U235	9.53e-02	6.1e-02	3.8e-02	PCI/GDRY	05/20/2009
U238	1.05e+00	2.1e-01	4.2e-02	PCI/GDRY	05/20/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02916G	QC batch #:	0005792G
Matrix:	SOIL	Assay batch #:	0013275W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.508e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	82.50 %	Analyst:	PMT
Ash/dry weight:	90.40 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 17:04	1000.0	AS29	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	1.31e+00	2.2e-01	3.2e-02	PCI/GDRY	05/20/2009
U235	1.00e-01	5.5e-02	2.9e-02	PCI/GDRY	05/20/2009
U238	1.08e+00	1.9e-01	3.7e-02	PCI/GDRY	05/20/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02921D	QC batch #:	0005769H
Matrix:	SOIL	Assay batch #:	0013258V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.545e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	91.74 %	Analyst:	PMT
Ash/dry weight:	96.00 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 17:05	1000.0	AS11	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	7.09e-01	1.6e-01	3.3e-02	PCI/GDRY	05/14/2009
U235	3.35e-02	4.2e-02	5.2e-02	PCI/GDRY	05/14/2009
U238	8.82e-01	1.8e-01	4.4e-02	PCI/GDRY	05/14/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02924G	QC batch #:	0005769H
Matrix:	SOIL	Assay batch #:	0013258V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.527e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	86.84 %	Analyst:	PMT
Ash/dry weight:	91.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 17:05	1000.0	AS24	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	5.49e-01	1.3e-01	4.1e-02	PCI/GDRY	05/14/2009
U235	2.57e-02	3.5e-02	3.7e-02	PCI/GDRY	05/14/2009
U238	6.04e-01	1.4e-01	4.7e-02	PCI/GDRY	05/14/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02925H	QC batch #:	0005769H
Matrix:	SOIL	Assay batch #:	0013258V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.530e-01 GASH	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	79.85 %	Analyst:	PMT
Ash/dry weight:	87.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 17:05	1000.0	AS26	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	5.21e-01	1.1e-01	3.2e-02	PCI/GDRY	05/14/2009
U235	4.44e-02	3.8e-02	3.8e-02	PCI/GDRY	05/14/2009
U238	5.06e-01	1.1e-01	2.4e-02	PCI/GDRY	05/14/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	LCS-00560089T	QC batch #:	0005769H
Matrix:	N/A	Assay batch #:	0013258V
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 17:05	1000.0	AS29	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	1.85e+00	1.6e-01	9.1e-03	PCI	05/14/2009
U235	1.32e-01	3.4e-02	8.3e-03	PCI	05/14/2009
U238	1.97e+00	1.7e-01	1.0e-02	PCI	05/14/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	RBK-00560088R	QC batch #:	0005769H
Matrix:	N/A	Assay batch #:	0013258V
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/14/2009 17:05	1000.0	AS33	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	1.62e-02	1.3e-02	1.6e-02	PCI	05/14/2009
U235	3.88e-03	8.4e-03	1.3e-02	PCI	05/14/2009
U238	7.13e-03	8.9e-03	1.1e-02	PCI	05/14/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	LCS-00560984R	QC batch #:	0005792G
Matrix:	N/A	Assay batch #:	0013275W
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 17:04	1000.0	AS09	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	1.95e+00	1.8e-01	1.3e-02	PCI	05/20/2009
U235	1.07e-01	3.4e-02	1.0e-02	PCI	05/20/2009
U238	1.99e+00	1.8e-01	1.2e-02	PCI	05/20/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	RBK-00560983Q	QC batch #:	0005792G
Matrix:	N/A	Assay batch #:	0013275W
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 17:04	1000.0	AS10	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	1.47e-02	1.4e-02	1.5e-02	PCI	05/20/2009
U235	1.56e-02	1.5e-02	1.3e-02	PCI	05/20/2009
U238	1.65e-02	1.5e-02	1.7e-02	PCI	05/20/2009

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG 0900021

QC BATCH SUMMARY

QC batch #: 0005769H
Preparation procedure: N/A
Analysis procedure: NAREL U-EICHROM

NAREL Sample #	QC Type	Yield (%)	± 2 σ Uncertainty (%)	Analyst
A9.02906E		105.00 %	7.76 %	PMT
A9.02906E	DUP	101.58 %	7.55 %	PMT
A9.02907F		102.12 %	7.58 %	PMT
A9.02921D		99.31 %	7.42 %	PMT
A9.02924G		97.83 %	7.26 %	PMT
A9.02925H		95.85 %	6.72 %	PMT
LCS-00560089T *	LCS	93.07 %	6.50 %	PMT
RBK-00560088R *	RBK	90.97 %	6.70 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG 0900021

QC BATCH SUMMARY

QC batch #: 0005792G
Preparation procedure: N/A
Analysis procedure: NAREL U-EICHROM

NAREL Sample #	QC Type	Yield (%)	± 2 σ Uncertainty (%)	Analyst
A9.02913D		94.25 %	6.63 %	PMT
A9.02913D	DUP	94.61 %	6.55 %	PMT
A9.02916G		96.15 %	6.67 %	PMT
LCS-00560984R *	LCS	100.35 %	7.48 %	PMT
RBK-00560983Q *	RBK	77.02 %	6.14 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0005769H Analytical Procedure: NAREL U-EICHROM

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity ± 2σ	Prep Date
00560088R	U234	1.62e-02 ± 1.3e-02	2009-05-07
00560088R	U235	3.88e-03 ± 8.4e-03	2009-05-07
00560088R	U238	7.13e-03 ± 8.9e-03	2009-05-07

LABORATORY DUPLICATES (PCI/GASH)

Sample ID	Nuclide	Original ± 2σ	Duplicate ± 2σ	RPD	Z
A9.02906E	U234	7.59e-01 ± 1.6e-01	8.10e-01 ± 1.7e-01	6.54	0.44 OK
A9.02906E	U235	5.74e-02 ± 5.3e-02	4.77e-02 ± 4.7e-02	18.37	-0.27 OK
A9.02906E	U238	8.24e-01 ± 1.7e-01	7.78e-01 ± 1.7e-01	5.76	-0.39 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added ± 2σ	Measured ± 2σ	%R	Z
00560089T	U234	1.96e+00 ± 2.8%	1.85e+00 ± 1.6e-01	94.13	-1.38 OK
00560089T	U235	9.38e-02 ± 2.6%	1.32e-01 ± 3.4e-02	140.76	2.09 OK
00560089T	U238	2.04e+00 ± 2.8%	1.97e+00 ± 1.7e-01	96.44	-0.83 OK

Analyst: Paula Thaxton 5/18/09
Thaxton, Paula M.

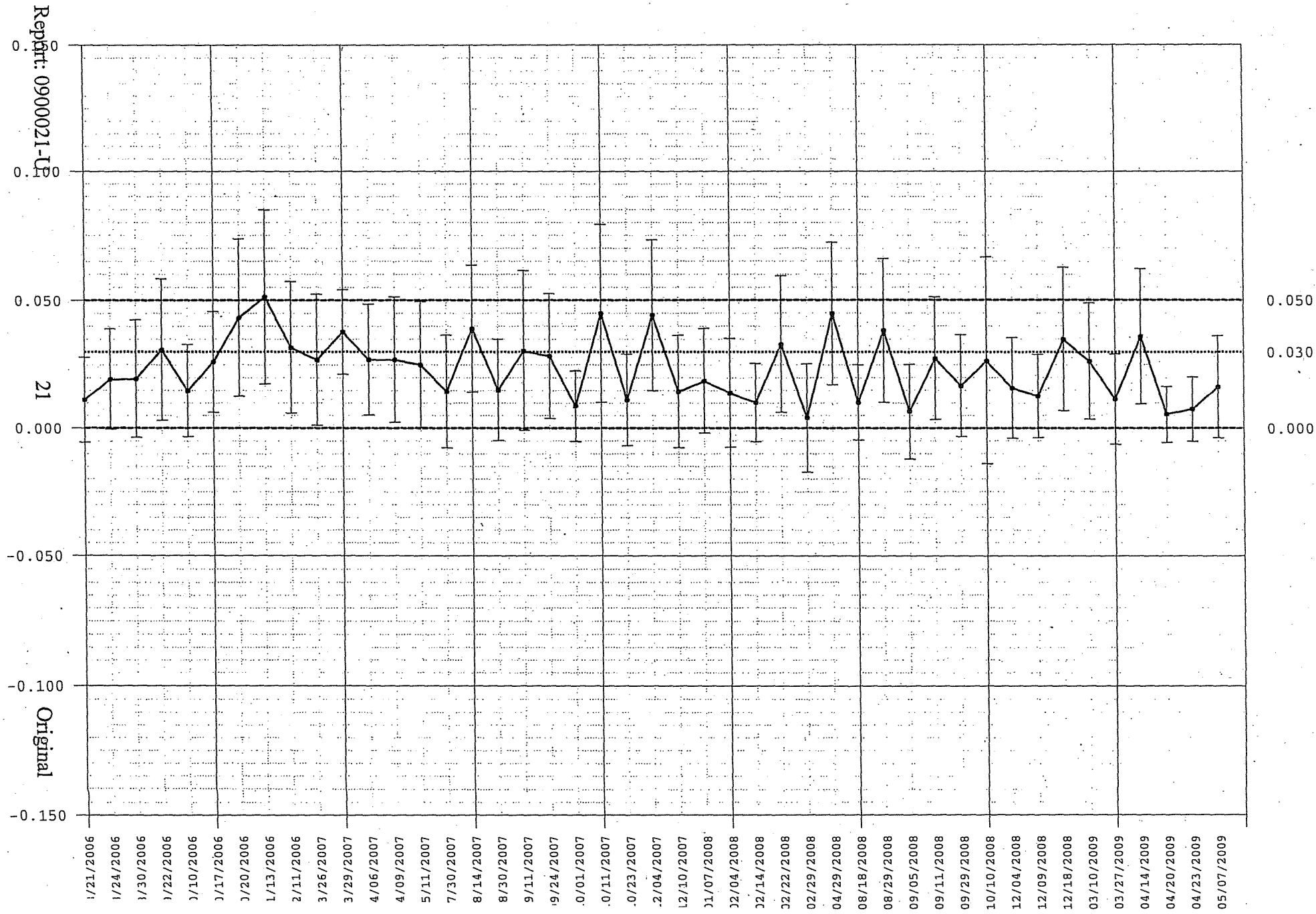
QA Officer: Kirk J. McGee 5/19/09

Method Blanks

Analyte: U234

Procedure: NAREL U-EICHROM

Analyst: Thaxton, Paula M.

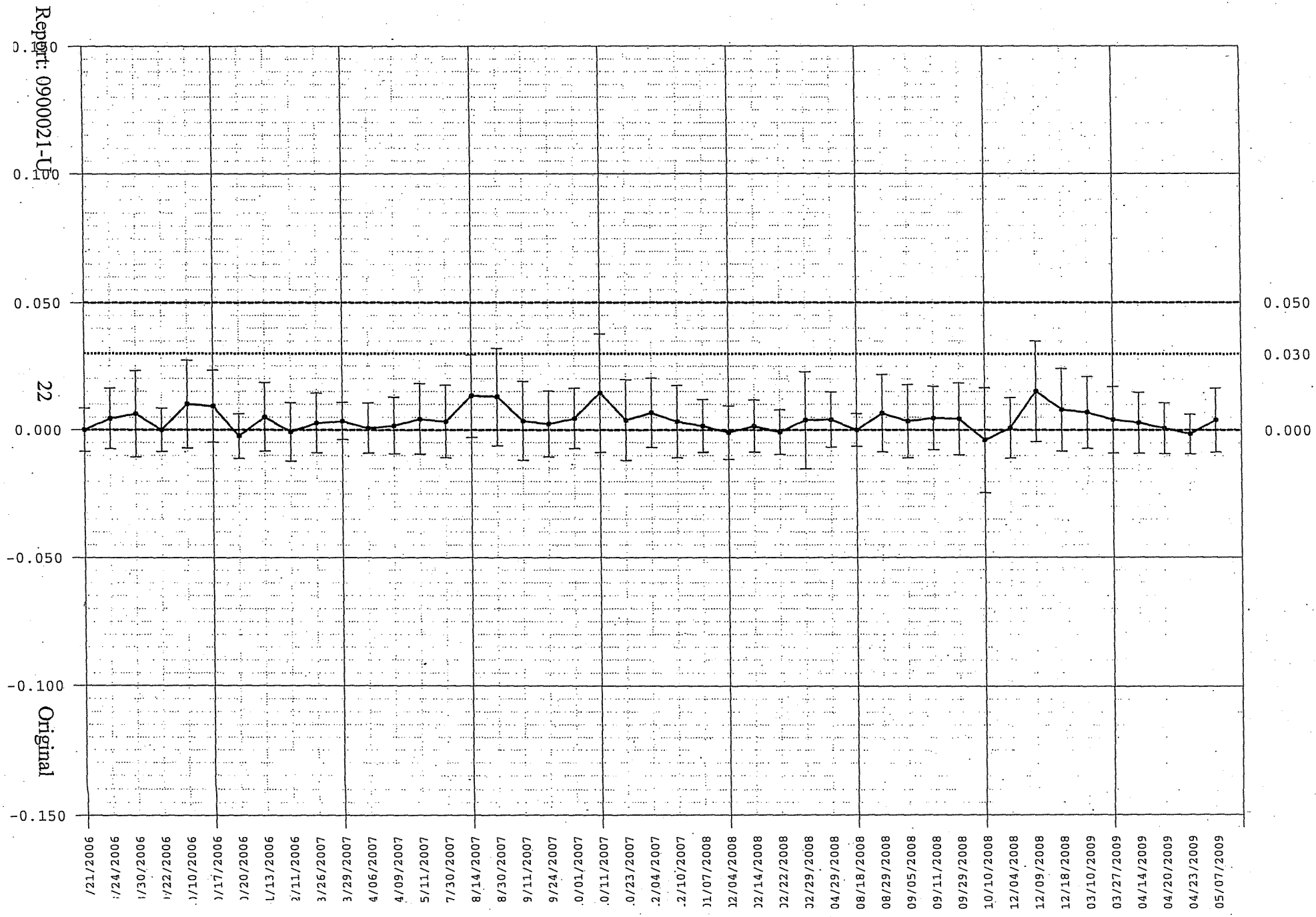


Method Blanks

Analyte: U235

Procedure: NAREL U-EICHROM

Analyst: Thaxton, Paula M.

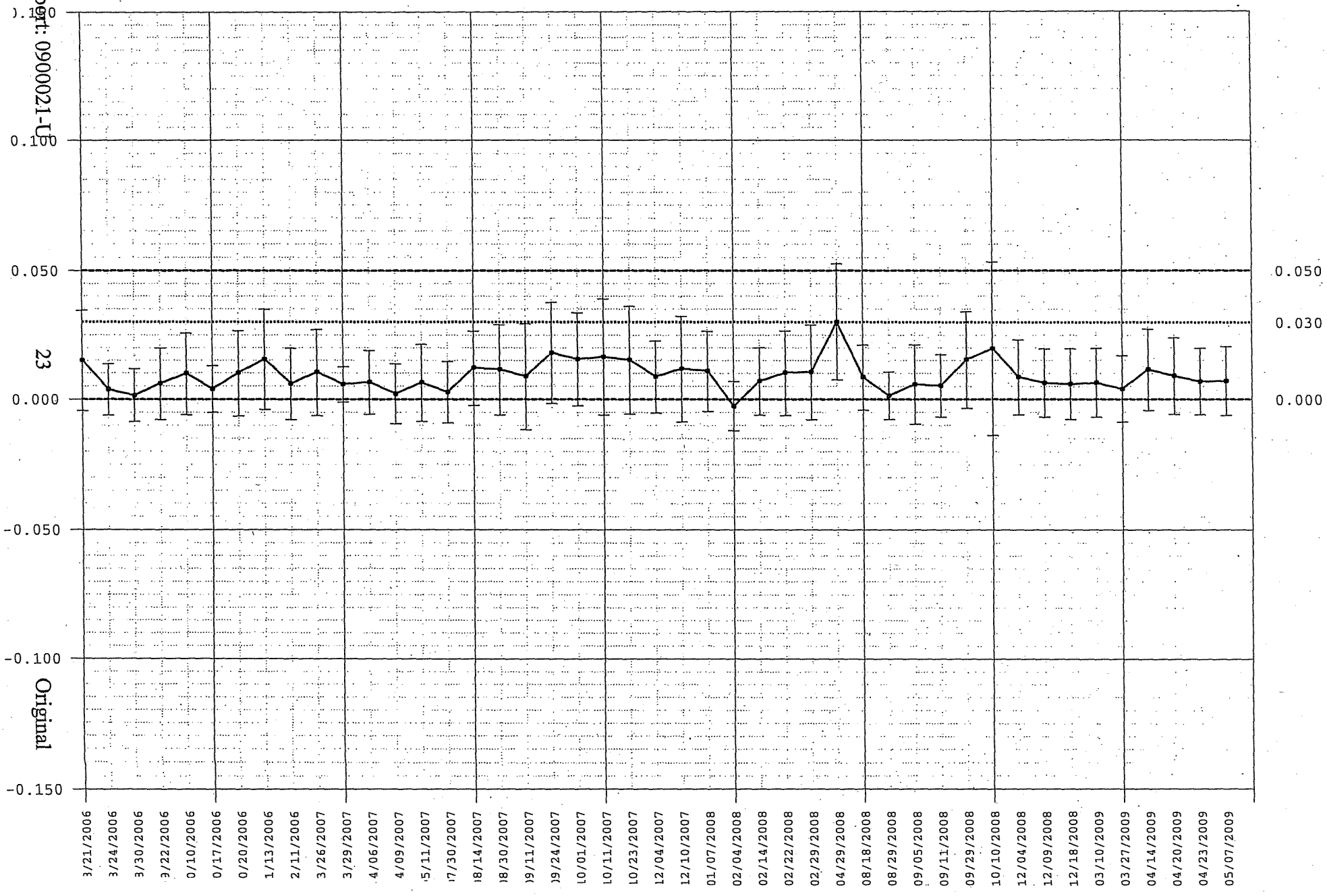


Method Blanks

Analyte: U238

Procedure: NAREL U-EICHROM

Analyst: Thaxton, Paula M.



National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0005792G Analytical Procedure: NAREL U-EICHROM

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity ± 2σ	Prep Date
00560983Q	U234	1.47e-02 ± 1.4e-02	2009-05-19
00560983Q	U235	1.56e-02 ± 1.5e-02	2009-05-19
00560983Q	U238	1.65e-02 ± 1.5e-02	2009-05-19

LABORATORY DUPLICATES (PCI/GASH)

Sample ID	Nuclide	Original ± 2σ	Duplicate ± 2σ	RPD	Z
A9.02913D	U234	1.07e+00 ± 2.2e-01	1.20e+00 ± 2.3e-01	11.74	0.83 OK
A9.02913D	U235	3.56e-02 ± 4.5e-02	1.00e-01 ± 6.5e-02	95.39	1.64 OK
A9.02913D	U238	1.05e+00 ± 2.2e-01	1.10e+00 ± 2.2e-01	5.41	0.37 OK

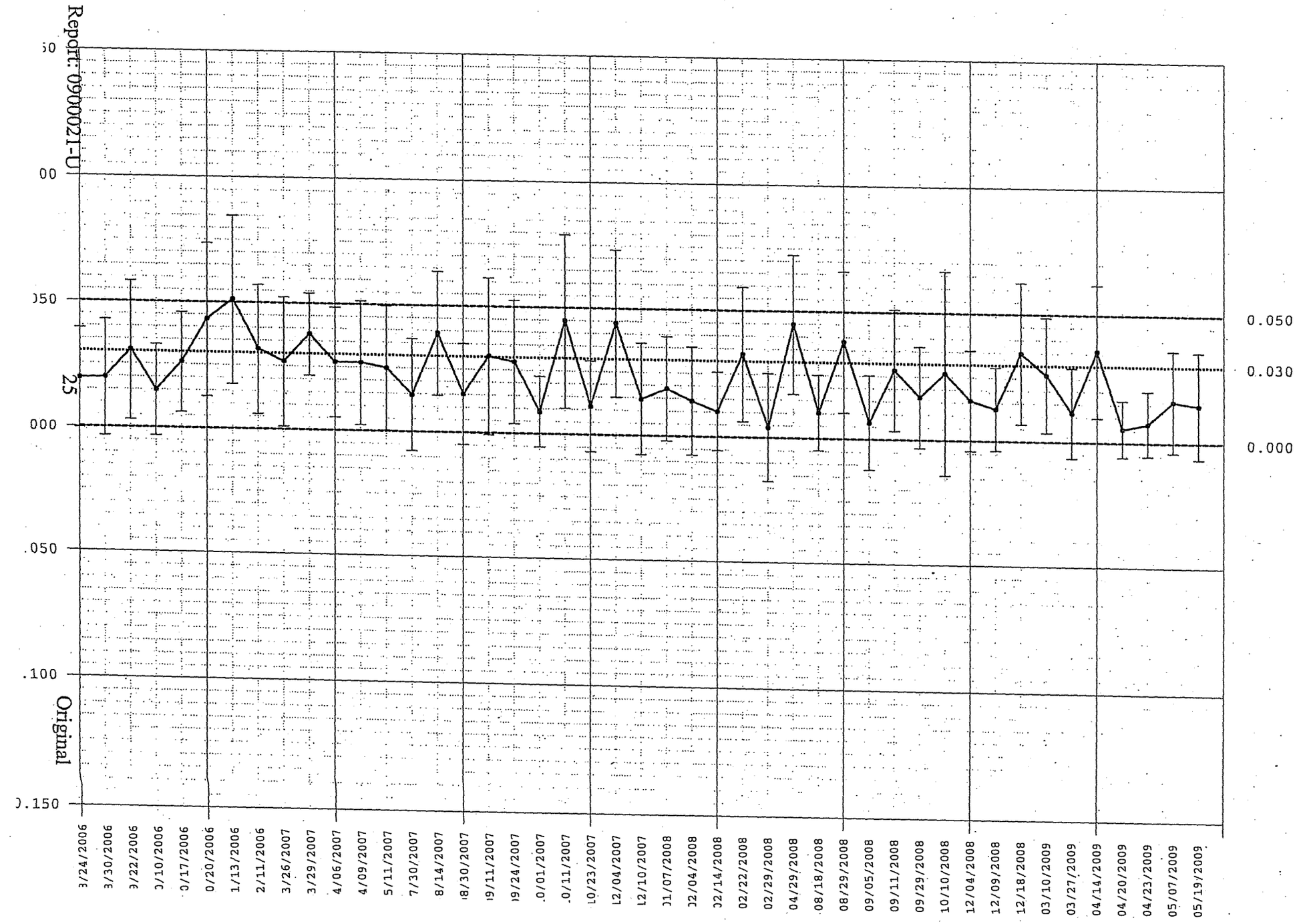
LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added ± 2σ	Measured ± 2σ	%R	Z
00560984R	U234	1.96e+00 ± 2.8%	1.95e+00 ± 1.8e-01	99.29	-0.15 OK
00560984R	U235	9.38e-02 ± 2.6%	1.07e-01 ± 3.4e-02	113.69	0.72 OK
00560984R	U238	2.04e+00 ± 2.8%	1.99e+00 ± 1.8e-01	97.56	-0.52 OK

Analyst: Paula M. Thaxton 5/21/09
Thaxton, Paula M.

QA Officer: Frank D. McGee 5/21/09

Method Blanks
Analyte: U234
Procedure: NAREL U-EICHROM
Analyst: Thaxton, Paula M.

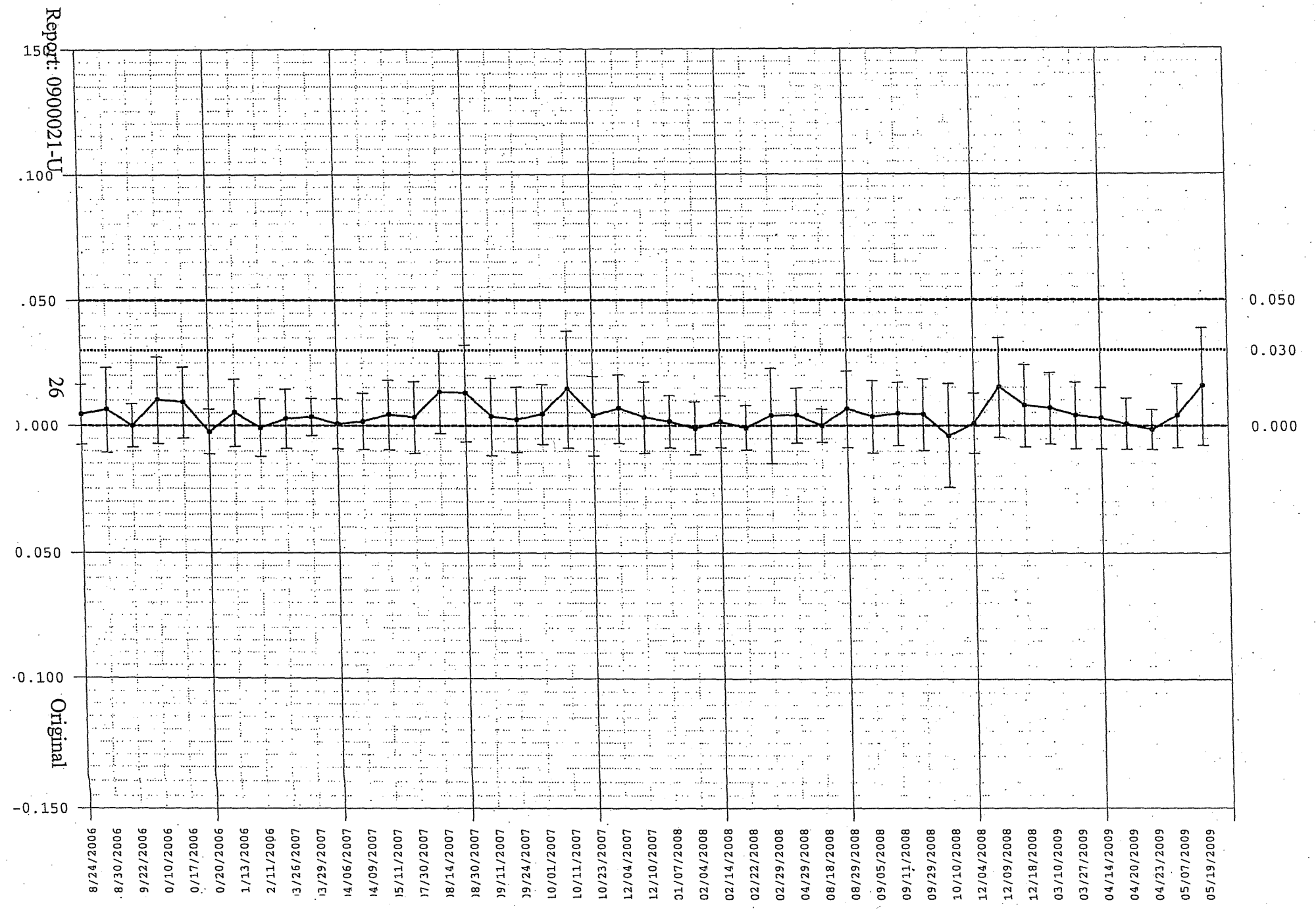


Method Blanks

Analyte: U235

Procedure: NAREL U-EICHROM

Analyst: Thaxton, Paula M.

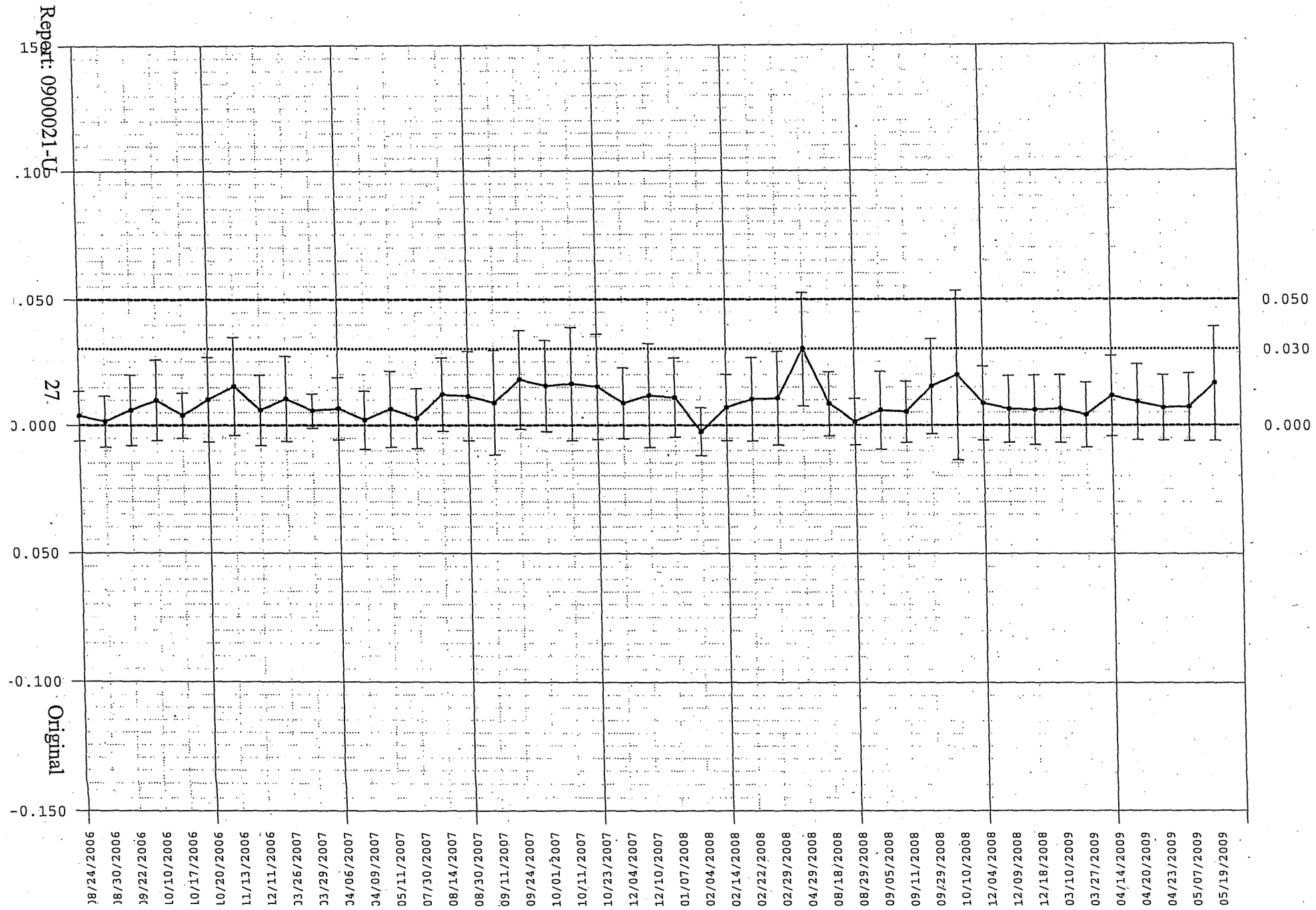


Method Blanks

Analyte: U238

Procedure: NAREL U-EICHROM

Analyst: Thaxton, Paula M.



U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
TH ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #0900021

Project:	Region 7 - Kansas Radium Dial Site, Wichita, KS
Analysis Procedure:	Actinides (Thorium) by Extraction Chromatography
Report ID:	0900021-TH
Report Type:	Original
Date Reported:	05/27/2009
Total Pages in Report:	29

SAMPLES

NAREL Sample #	Client Sample ID	Type	Matrix	Date Collected	Date Received
A9.02906E	650-SB-BG1 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02907F	650-SB-BG2 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02908G	650-SB-7-2 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02909H	650-SB-10-1 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02910A	650-SB-10-1 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02911B	650-SB-13-1 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02912C	650-SB-13-1 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02913D	650-SB-13-2 (0-3.5 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02914E	650-SB-13-2 (3.5-4 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02915F	650-SB-13-3 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02916G	650-SB-13-3 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02917H	650-SB-13-3 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02918J	650-SB-17-1 (0-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02919K	650-SB-17-1 (3-4 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02920C	650-SS-9-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02921D	650-SS-12-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02922E	650-SS-23-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02923F	650-SS-24-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02924G	650-SS-BGA	SAM	SOIL	03/26/2009	04/02/2009
A9.02925H	650-SS-BGB	SAM	SOIL	03/26/2009	04/02/2009

EXCEPTIONS

1. Packaging and Shipping - No problems were observed.
2. Documentation - No problems were observed.
3. Sample Preparation - No problems were encountered.
4. Analysis - Only samples A9.02906, A9.02907, A9.02913, A9.02916, A9.02921, A9.02924, and A9.02925 were analyzed for thorium as requested by the client. For samples A9.02913 and A9.02916, the aliquant size used for these samples was very small in anticipation of elevated analyte concentration. The concentration of thorium present in these samples, however, was not elevated as anticipated. In an effort to provide results with lower uncertainties, samples A9.02913 and A9.02916 were reanalyzed with larger aliquants. The results of the reanalysis of these samples are reported in this data package.
5. Holding Times - All holding times were met.

QUALITY CONTROL

1. QC samples - All QC analysis results met NAREL acceptance criteria.
2. Yields - All chemical yields were within acceptance limits.
3. Instruments - Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 5-28-09

Mary F. Wisdom Date
Quality Assurance Manager, NAREL

John Griggs 5/28/09

John G. Griggs, Ph.D. Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Method blank

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the *Z* score is computed.

Each standard uncertainty used to compute a *Z* score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

ANALYSIS SUMMARY

Analysis Procedure: NAREL TH-EICHROM
Title: Actinides (Thorium) by Extraction Chromatography

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
A9.02906E		N/A	05/14/2009	0013257U	0005768G
A9.02906E	DUP	N/A	05/14/2009	0013257U	0005768G
A9.02907F		N/A	05/14/2009	0013257U	0005768G
A9.02913D		N/A	05/21/2009	0013274V	0005791F
A9.02913D	DUP	N/A	05/21/2009	0013274V	0005791F
A9.02916G		N/A	05/21/2009	0013274V	0005791F
A9.02921D		N/A	05/14/2009	0013257U	0005768G
A9.02924G		N/A	05/14/2009	0013257U	0005768G
A9.02925H		N/A	05/14/2009	0013257U	0005768G
LCS-00560086P *	LCS	N/A	05/14/2009	0013257U	0005768G
RBK-00560085N *	RBK	N/A	05/14/2009	0013257U	0005768G
LCS-00560976R *	LCS	N/A	05/21/2009	0013274V	0005791F
RBK-00560974P *	RBK	N/A	05/21/2009	0013274V	0005791F

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

PREPARATION METHOD(S) USED

Procedure ID	Title

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02906E	QC batch #:	0005768G
Matrix:	SOIL	Assay batch #:	0013257U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.532e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	82.52 %	Analyst:	PMT
Ash/dry weight:	95.20 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:01	1000.0	AS29	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	1.21e-01	8.2e-02	7.9e-02	PCI/GDRY	05/12/2009
Th228	1.34e+00	2.0e-01	8.3e-02	PCI/GDRY	05/12/2009
Th230	1.21e+00	1.9e-01	2.6e-02	PCI/GDRY	05/12/2009
Th232	1.24e+00	1.9e-01	4.3e-02	PCI/GDRY	05/12/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02906E	QC batch #:	0005768G
Matrix:	SOIL	Assay batch #:	0013257U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.509e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	82.52 %	Analyst:	PMT
Ash/dry weight:	95.20 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:01	1000.0	AS33	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	6.16e-02	7.9e-02	1.2e-01	PCI/GDRY	05/12/2009
Th228	1.51e+00	2.4e-01	1.1e-01	PCI/GDRY	05/12/2009
Th230	1.29e+00	2.1e-01	5.1e-02	PCI/GDRY	05/12/2009
Th232	1.17e+00	2.0e-01	4.1e-02	PCI/GDRY	05/12/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02907F	QC batch #:	0005768G
Matrix:	SOIL	Assay batch #:	0013257U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.537e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	84.22 %	Analyst:	PMT
Ash/dry weight:	95.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:01	1000.0	AS35	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	2.95e-02	6.0e-02	1.0e-01	PCI/GDRY	05/12/2009
Th228	1.38e+00	2.2e-01	1.3e-01	PCI/GDRY	05/12/2009
Th230	1.10e+00	1.9e-01	5.3e-02	PCI/GDRY	05/12/2009
Th232	1.10e+00	1.9e-01	3.9e-02	PCI/GDRY	05/12/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02913D	QC batch #:	0005791F
Matrix:	SOIL	Assay batch #:	0013274V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.014e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	84.24 %	Analyst:	PMT
Ash/dry weight:	94.80 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 16:52	1000.0	AS06	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	8.08e-02	1.0e-01	1.6e-01	PCI/GDRY	05/20/2009
Th228	5.41e-01	1.8e-01	1.6e-01	PCI/GDRY	05/20/2009
Th230	1.03e+00	2.4e-01	6.9e-02	PCI/GDRY	05/20/2009
Th232	5.58e-01	1.7e-01	6.0e-02	PCI/GDRY	05/20/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02913D	QC batch #:	0005791F
Matrix:	SOIL	Assay batch #:	0013274V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.014e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	84.24 %	Analyst:	PMT
Ash/dry weight:	94.80 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 16:56	1000.0	AS07	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	1.05e-01	1.2e-01	1.6e-01	PCI/GDRY	05/20/2009
Th228	4.89e-01	1.9e-01	2.1e-01	PCI/GDRY	05/20/2009
Th230	9.76e-01	2.4e-01	9.2e-02	PCI/GDRY	05/20/2009
Th232	6.10e-01	1.8e-01	7.3e-02	PCI/GDRY	05/20/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02916G	QC batch #:	0005791F
Matrix:	SOIL	Assay batch #:	0013274V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.508e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	82.50 %	Analyst:	PMT
Ash/dry weight:	90.40 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 16:56	1000.0	AS08	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	6.53e-02	7.3e-02	1.1e-01	PCI/GDRY	05/20/2009
Th228	9.84e-01	1.9e-01	1.0e-01	PCI/GDRY	05/20/2009
Th230	1.29e+00	2.3e-01	3.5e-02	PCI/GDRY	05/20/2009
Th232	8.66e-01	1.7e-01	4.7e-02	PCI/GDRY	05/20/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02921D	QC batch #:	0005768G
Matrix:	SOIL	Assay batch #:	0013257U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.545e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	91.74 %	Analyst:	PMT
Ash/dry weight:	96.00 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:01	1000.0	AS36	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	7.11e-02	7.9e-02	1.1e-01	PCI/GDRY	05/12/2009
Th228	7.87e-01	1.7e-01	1.2e-01	PCI/GDRY	05/12/2009
Th230	7.48e-01	1.5e-01	3.9e-02	PCI/GDRY	05/12/2009
Th232	8.28e-01	1.6e-01	5.2e-02	PCI/GDRY	05/12/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02924G	QC batch #:	0005768G
Matrix:	SOIL	Assay batch #:	0013257U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.527e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	86.84 %	Analyst:	PMT
Ash/dry weight:	91.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:01	1000.0	AS37	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	1.30e-02	6.4e-02	1.3e-01	PCI/GDRY	05/12/2009
Th228	7.17e-01	1.6e-01	1.2e-01	PCI/GDRY	05/12/2009
Th230	6.00e-01	1.4e-01	4.6e-02	PCI/GDRY	05/12/2009
Th232	8.17e-01	1.6e-01	4.6e-02	PCI/GDRY	05/12/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02925H	QC batch #:	0005768G
Matrix:	SOIL	Assay batch #:	0013257U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.530e-01 GASH	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	79.85 %	Analyst:	PMT
Ash/dry weight:	87.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:01	1000.0	AS38	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	4.15e-02	7.1e-02	1.2e-01	PCI/GDRY	05/12/2009
Th228	8.42e-01	1.7e-01	1.1e-01	PCI/GDRY	05/12/2009
Th230	5.44e-01	1.3e-01	4.8e-02	PCI/GDRY	05/12/2009
Th232	5.61e-01	1.3e-01	6.1e-02	PCI/GDRY	05/12/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	LCS-00560086P	QC batch #:	0005768G
Matrix:	N/A	Assay batch #:	0013257U
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:01	1000.0	AS39	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	-2.23e-03	1.1e-02	2.8e-02	PCI	05/12/2009
Th228	2.40e-02	1.9e-02	2.8e-02	PCI	05/12/2009
Th230	2.33e+00	2.0e-01	1.0e-02	PCI	05/12/2009
Th232	1.68e-02	1.2e-02	1.2e-02	PCI	05/12/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	RBK-00560085N	QC batch #:	0005768G
Matrix:	N/A	Assay batch #:	0013257U
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/13/2009 16:01	1000.0	AS40	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	-1.13e-03	1.1e-02	2.6e-02	PCI	05/12/2009
Th228	2.06e-02	1.8e-02	2.7e-02	PCI	05/12/2009
Th230	7.29e-03	9.3e-03	1.3e-02	PCI	05/12/2009
Th232	1.03e-02	9.8e-03	1.0e-02	PCI	05/12/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	LCS-00560976R	QC batch #:	0005791F
Matrix:	N/A	Assay batch #:	0013274V
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 16:52	1000.0	AS21	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	2.21e-03	1.5e-02	3.0e-02	PCI	05/20/2009
Th228	3.09e-03	1.8e-02	3.4e-02	PCI	05/20/2009
Th230	2.30e+00	2.0e-01	1.2e-02	PCI	05/20/2009
Th232	8.03e-03	9.3e-03	1.2e-02	PCI	05/20/2009

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	RBK-00560974P	QC batch #:	0005791F
Matrix:	N/A	Assay batch #:	0013274V
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/20/2009 16:52	1000.0	AS24	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Th227	3.71e-03	1.6e-02	3.2e-02	PCI	05/20/2009
Th228	2.21e-02	2.2e-02	3.3e-02	PCI	05/20/2009
Th230	6.22e-03	8.4e-03	9.0e-03	PCI	05/20/2009
Th232	-6.90e-04	4.6e-03	1.2e-02	PCI	05/20/2009

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG 0900021

QC BATCH SUMMARY

QC batch #: 0005768G
Preparation procedure: N/A
Analysis procedure: NAREL TH-EICHROM

NAREL Sample #	QC Type	Yield (%)	± 2 σ Uncertainty (%)	Analyst
A9.02906E		94.35 %	5.15 %	PMT
A9.02906E	DUP	94.52 %	5.21 %	PMT
A9.02907F		96.42 %	5.28 %	PMT
A9.02921D		94.89 %	5.22 %	PMT
A9.02924G		93.68 %	5.17 %	PMT
A9.02925H		93.81 %	5.13 %	PMT
LCS-00560086P *	LCS	95.84 %	5.26 %	PMT
RBK-00560085N *	RBK	94.50 %	5.15 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

SDG 0900021

QC BATCH SUMMARY

QC batch #: 0005791F
Preparation procedure: N/A
Analysis procedure: NAREL TH-EICHROM

NAREL Sample #	QC Type	Yield (%)	± 2 σ Uncertainty (%)	Analyst
A9.02913D		92.38 %	5.70 %	PMT
A9.02913D	DUP	87.72 %	5.42 %	PMT
A9.02916G		99.01 %	6.01 %	PMT
LCS-00560976R *	LCS	100.55 %	6.04 %	PMT
RBK-00560974P *	RBK	93.37 %	5.75 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0005768G Analytical Procedure: NAREL TH-EICHROM

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity ± 2σ	Prep Date
00560085N	TH227	-1.13e-03 ± 1.1e-02	2009-05-07
00560085N	TH228	2.06e-02 ± 1.8e-02	2009-05-07
00560085N	TH230	7.29e-03 ± 9.3e-03	2009-05-07
00560085N	TH232	1.03e-02 ± 9.8e-03	2009-05-07

LABORATORY DUPLICATES (PCI/GASH)

Sample ID	Nuclide	Original ± 2σ	Duplicate ± 2σ	RPD	Z
A9.02906E	TH227	1.27e-01 ± 8.6e-02	6.47e-02 ± 8.3e-02	65.14	-1.05 OK
A9.02906E	TH228	1.40e+00 ± 2.1e-01	1.58e+00 ± 2.5e-01	12.17	1.11 OK
A9.02906E	TH230	1.27e+00 ± 2.0e-01	1.35e+00 ± 2.2e-01	6.18	0.55 OK
A9.02906E	TH232	1.30e+00 ± 2.0e-01	1.23e+00 ± 2.1e-01	5.70	-0.50 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added ± 2σ	Measured ± 2σ	%R	Z
00560086P	TH227	NO SPIKE DATA			
00560086P	TH228	NO SPIKE DATA			
00560086P	TH230	2.49e+00 ± 2.8%	2.33e+00 ± 2.0e-01	93.92	-1.43 OK
00560086P	TH232	NO SPIKE DATA			

Analyst: Paula Thaxton 5/18/09
Thaxton, Paula M.

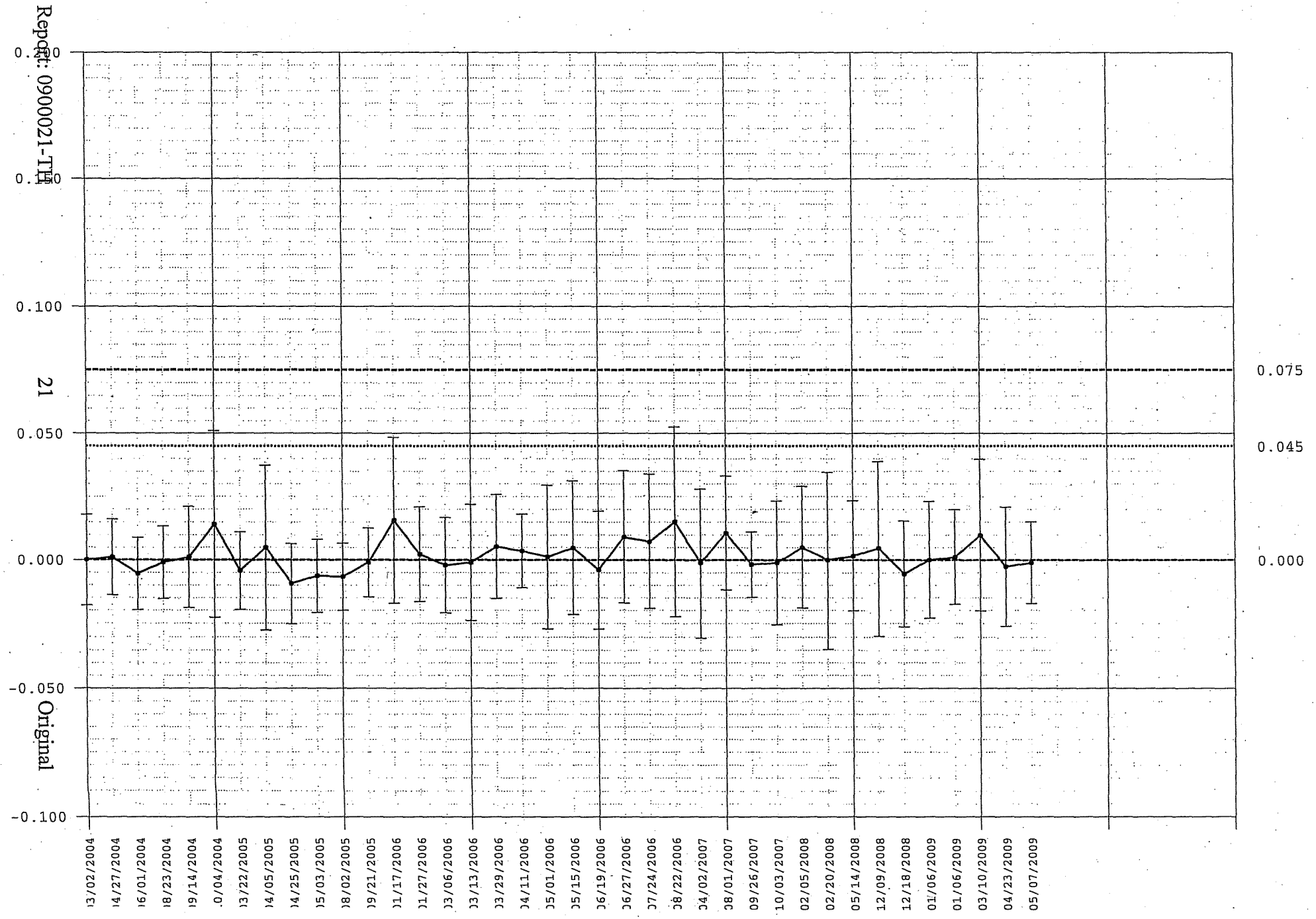
QA Officer: [signature] 5/19/09

Method Blanks

Analyte: TH227

Procedure: NAREL TH-EICHROM

Analyst: Thaxton, Paula M.

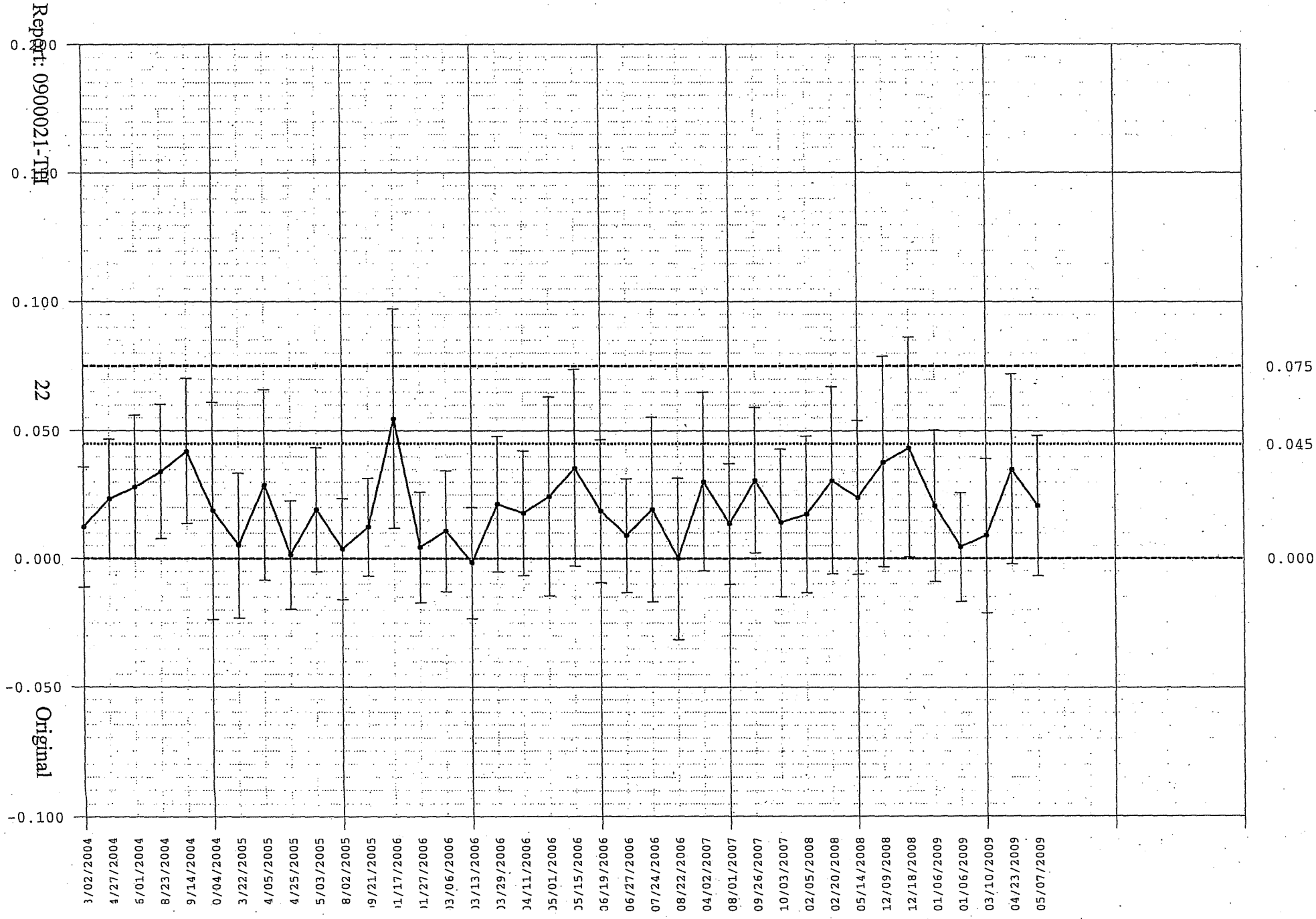


Method Blanks

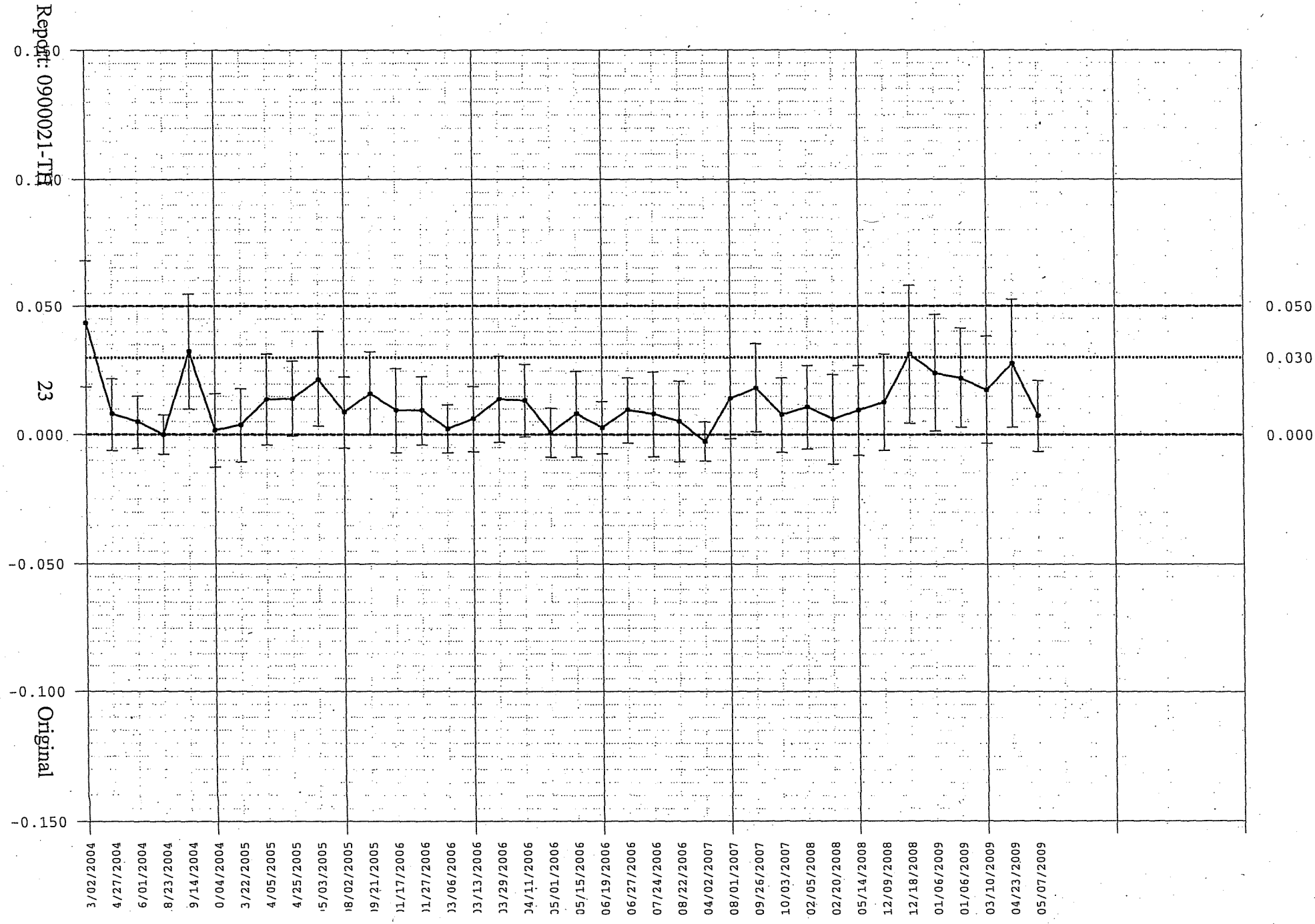
Analyte: TH228

Procedure: NAREL TH-EICHROM

Analyst: Thaxton, Paula M.



Method Blanks
Analyte: TH230
Procedure: NAREL TH-EICHROM
Analyst: Thaxton, Paula M.

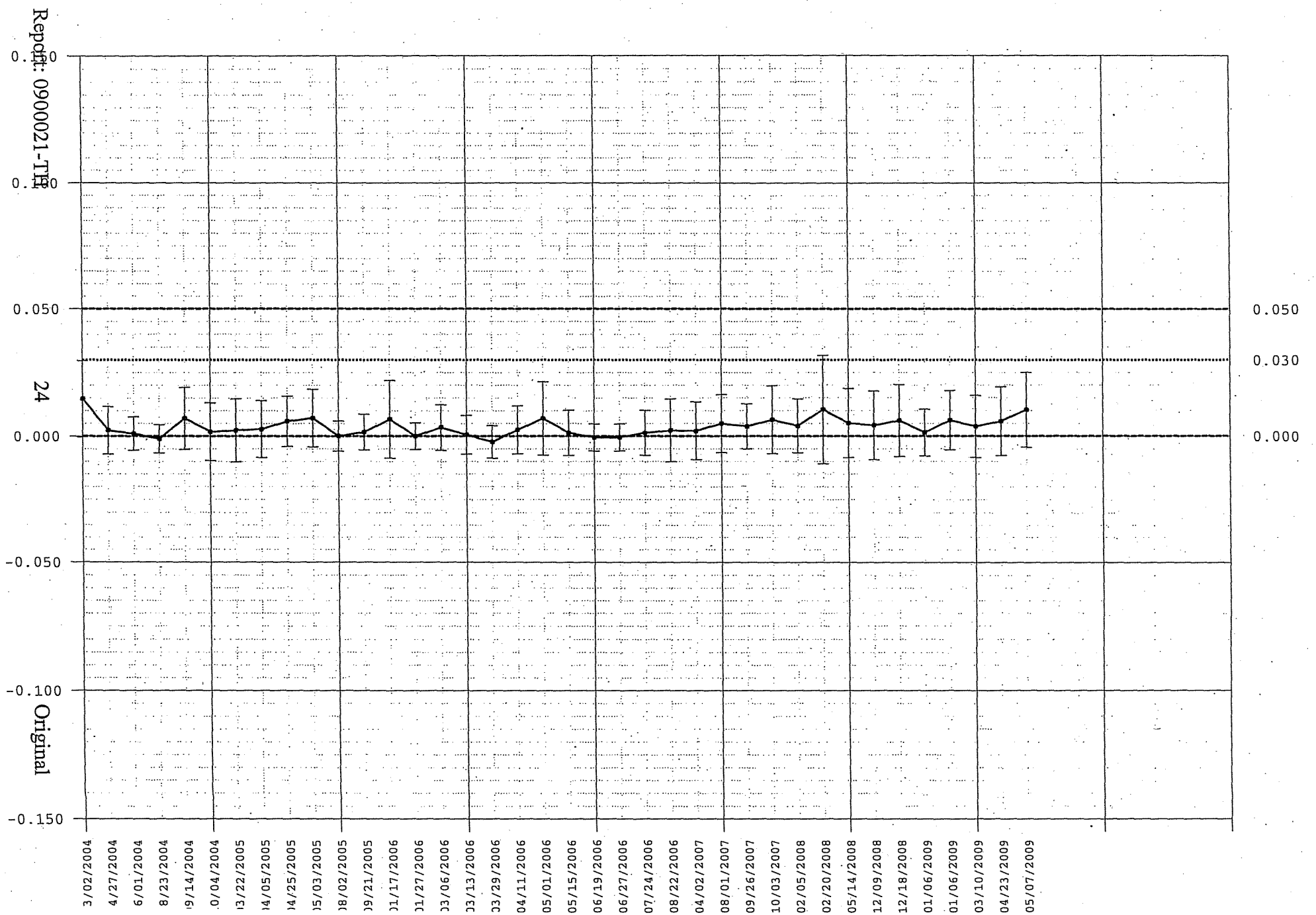


Method Blanks

Analyte: TH232

Procedure: NAREL TH-EICHROM

Analyst: Thaxton, Paula M.



National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0005791F Analytical Procedure: NAREL TH-EICHROM

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity ± 2σ	Prep Date
00560974P	TH227	3.71e-03 ± 1.6e-02	2009-05-19
00560974P	TH228	2.21e-02 ± 2.2e-02	2009-05-19
00560974P	TH230	6.22e-03 ± 8.4e-03	2009-05-19
00560974P	TH232	-6.90e-04 ± 4.6e-03	2009-05-19

LABORATORY DUPLICATES (PCI/GASH)

Sample ID	Nuclide	Original ± 2σ	Duplicate ± 2σ	RPD	Z
A9.02913D	TH227	8.52e-02 ± 1.1e-01	1.11e-01 ± 1.2e-01	26.52	0.32 OK
A9.02913D	TH228	5.71e-01 ± 1.9e-01	5.16e-01 ± 2.0e-01	10.04	-0.39 OK
A9.02913D	TH230	1.09e+00 ± 2.5e-01	1.03e+00 ± 2.5e-01	5.83	-0.34 OK
A9.02913D	TH232	5.89e-01 ± 1.8e-01	6.44e-01 ± 1.9e-01	8.95	0.42 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added ± 2σ	Measured ± 2σ	%R	Z
00560976R	TH227	NO SPIKE DATA			
00560976R	TH228	NO SPIKE DATA			
00560976R	TH230	2.49e+00 ± 2.8%	2.30e+00 ± 2.0e-01	92.57	-1.72 OK
00560976R	TH232	NO SPIKE DATA			

Analyst: Paula M Thaxton 5/21/09
Thaxton, Paula M.

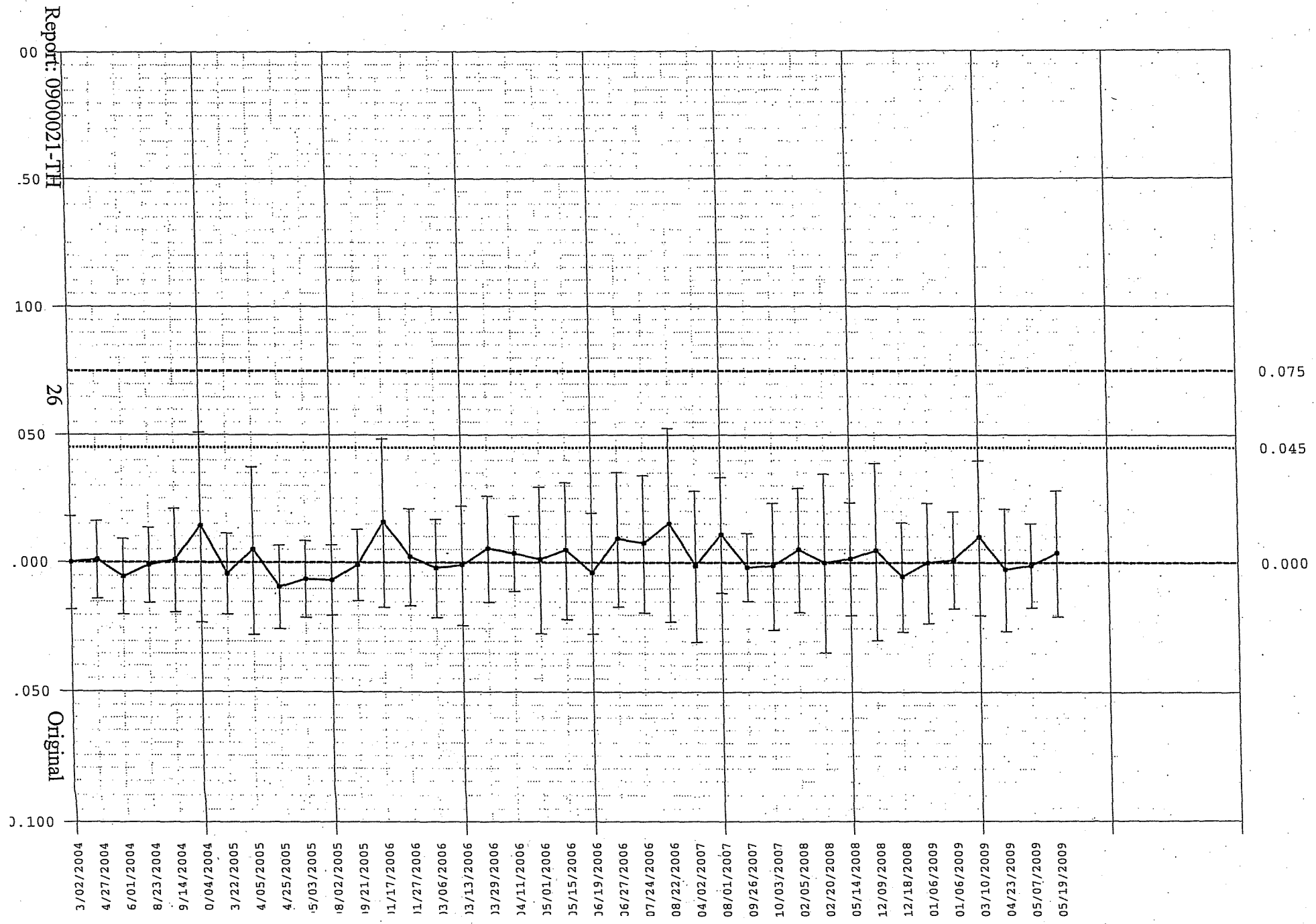
QA Officer: Karl D. McEwan 5/21/09

Method Blanks

Analyte: TH227

Procedure: NAREL TH-EICHROM

Analyst: Thaxton, Paula M.

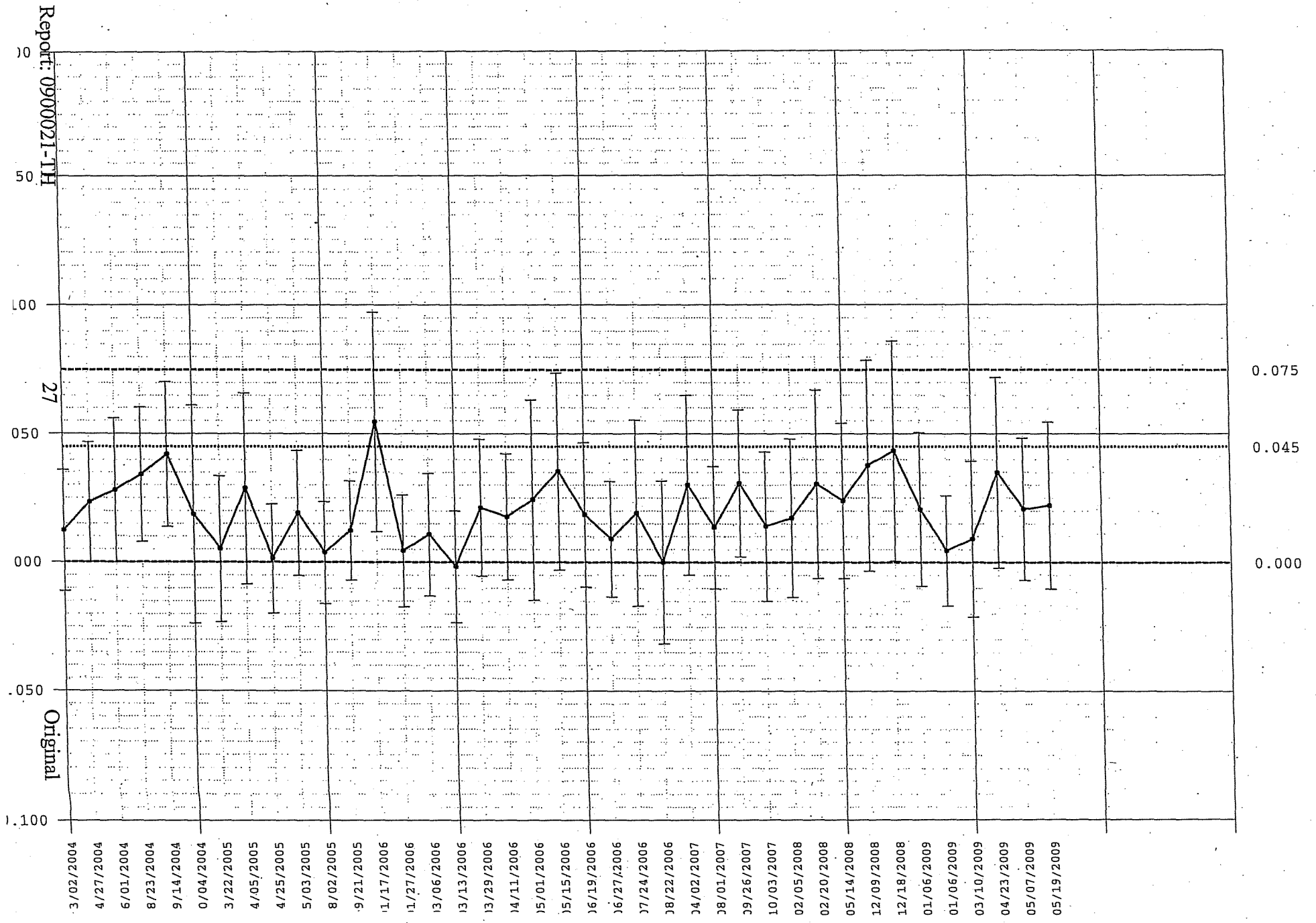


Method Blanks

Analyte: TH228

Procedure: NAREL TH-EICHROM

Analyst: Thaxton, Paula M.

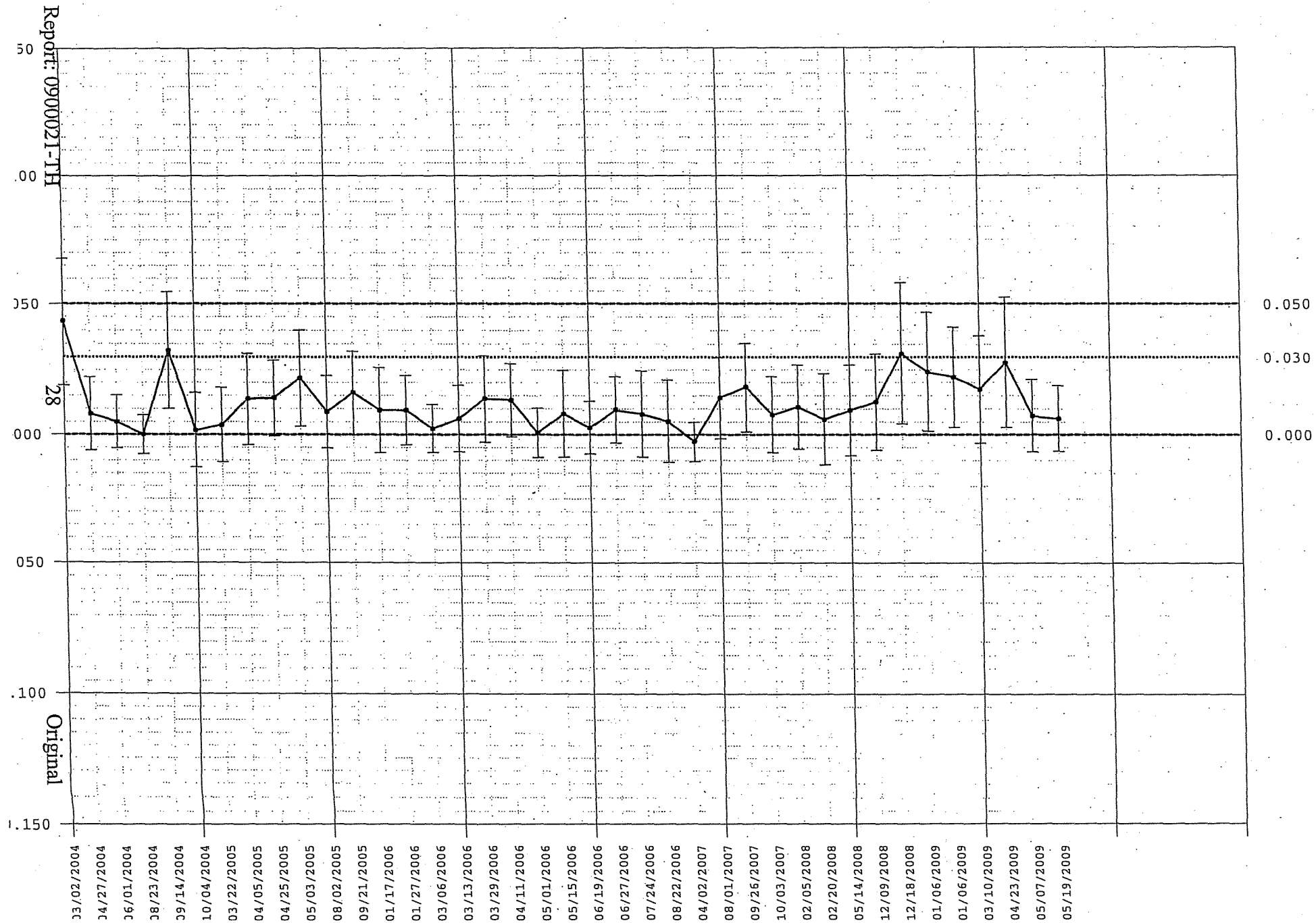


Method Blanks

Analyte: TH230

Procedure: NAREL TH-EICHROM

Analyst: Thaxton, Paula M.

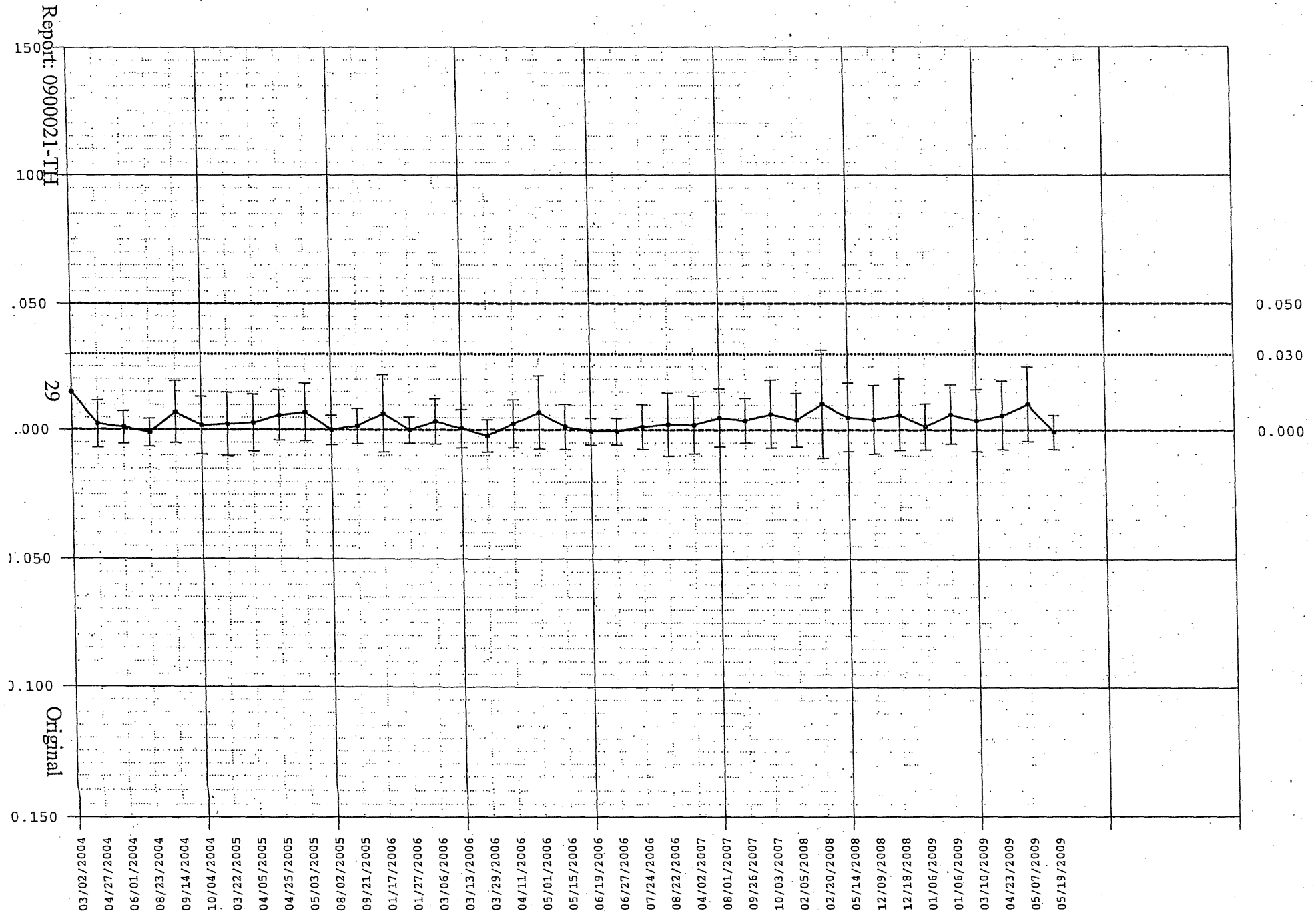


Method Blanks

Analyte: TH232

Procedure: NAREL TH-EICHROM

Analyst: Thaxton, Paula M.



APPENDIX F

REMOVAL SITE EVALUATION FORM

SUPERFUND REMOVAL SITE EVALUATION
and
REMOVAL PRELIMINARY ASSESSMENT

I. SITE NAME AND LOCATION:

NAME: Radiation – Standard Products, Inc. (Former)

ADDRESS OR OTHER LOCATION IDENTIFIER: 650 E. Gilbert Street

CITY: Wichita	**STATE:** Kansas	**ZIP:** 67211

DIRECTIONS TO SITE: From Kansas City, Missouri, take Interstate 35 south to exit 50. Merge onto E Kellogg Drive. Continue to follow US-400. Take the Washington Avenue exit. Turn left at Washington Street. Turn right at E. Gilbert St.

MAP ATTACHED: See Figure 1 with RSE Trip Report

II. PROGRAM CONTACTS:

REQUESTED BY: Randy Schademann	**DATE OF REQUEST:** 2/25/09

AGENCY/OFFICE: US EPA Region 7 Superfund Division

MAILING ADDRESS: 901 N. 5th Street

CITY: Kansas City	**STATE:** Kansas	**ZIP:** 66101
TELEPHONE: (913) 551-7331	**FAX:** (913) 551-9331	

EVALUATOR: Rob Monnig

AGENCY/OFFICE: Tetra Tech EM Inc.

MAILING ADDRESS: 415 Oak Street

CITY: Kansas City	**STATE:** Missouri	**ZIP:** 64106
TELEPHONE: (816) 412-1775	**FAX:** (816) 410-1748	

III. REMOVAL SITE EVALUATION CRITERIA [40 CFR 300.410(e)]

IS THERE A RELEASE AS DEFINED BY THE NCP: **YES X or NO __**

EXPLAIN: A release of radiation contamination (primarily Radium 226 [Ra-226]) to soil has occurred.

*(A **RELEASE** is defined as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment of barrels, containers, and other closed receptacles containing any hazardous substances or pollutant or contaminant), but excludes: workplace exposures; engine exhaust emissions; nuclear releases otherwise regulated; and the normal application of fertilizer. For purposes of the NCP, release also means threat of release.)*

IS THE SOURCE A FACILITY OR VESSEL AS DEFINED BY THE NCP: **YES X or NO __**

EXPLAIN: The area where the radiation contamination was released is considered a facility as defined by the NCP.

*(A **FACILITY** is defined as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or POTW), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft or any site or area, where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any vessel. A **VESSEL** is defined as any description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel.)*

SUPERFUND REMOVAL SITE EVALUATION
and
REMOVAL PRELIMINARY ASSESSMENT

DOES THE RELEASE INVOLVE A HAZARDOUS SUBSTANCE, OR POLLUTANT OR CONTAMINANT AS DEFINED BY THE NCP: **YES X or NO __**

EXPLAIN: Radiation contamination is considered a hazardous substance as defined by the NCP.

*(A **HAZARDOUS SUBSTANCE** means any substance, element, compound, mixture, solution, hazardous waste, toxic pollutant, hazardous air pollutant, or imminently hazardous chemical substance or mixture designated pursuant to the CWA, CERCLA, SDWA, CAA or TSCA. The term does not include petroleum products, natural gas, natural gas liquids, liquefied natural gas, synthetic gas or mixtures of natural and synthetic gas. The definition of **POLLUTANT or CONTAMINANT** includes, but is not limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions or physical deformations, in such organisms or their offspring. The term does not include petroleum products, natural gas, natural gas liquids, liquefied natural gas, synthetic gas or mixtures of natural and synthetic gas).*

IS THE RELEASE SUBJECT TO THE LIMITATIONS ON RESPONSE: **YES __ or NO X**

EXPLAIN: The release does not meet criteria for limitations on response.

*(The **LIMITATIONS ON RESPONSE** provisions of the NCP (40 CFR 300.400(B) states that removals shall not be undertaken in response to a release: of a naturally occurring substance in its unaltered or natural form; from products that are a part of the structure of, and result in exposure within, residential buildings or business or community structures; or into public or private drinking water supplies due to deterioration of the system through ordinary use.)*

DOES THE QUANTITY OR CONCENTRATION WARRANT RESPONSE: **YES X or NO __**

EXPLAIN: Based on the concentration of radiation-contaminated soil at the property, follow-up Superfund response is warranted.

HAS A PRP BEEN IDENTIFIED: **YES X or NO __**

EXPLAIN: A PRP has been identified.

IV. CONDITIONS TO WARRANT REMOVAL [40 CFR 300.415(b)(2)]:

ACTUAL OR POTENTIAL EXPOSURE TO HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS: **YES X or NO __**

EXPLAIN: A release of hazardous substances to residential soils has occurred, as indicated by analytical results of samples collected from the site by the Kansas Department of Health and Environment (KDHE) in 2006, and Tetra Tech START in March 2009; the potential for human exposure to elevated levels of radiation (primarily Ra-226) exists at the site.

ACTUAL OR POTENTIAL CONTAMINATION OF DRINKING WATER SUPPLIES: **YES or NO_X_**

EXPLAIN: Because the site vicinity is served by the City of Wichita water department, and the contaminated soils are shallow and limited to a discrete area, it is unlikely that any drinking water supplies have been impacted by site contaminants.

SUPERFUND REMOVAL SITE EVALUATION
and
REMOVAL PRELIMINARY ASSESSMENT

HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN DRUMS, BARRELS, OR BULK STORAGE CONTAINERS: **YES __ or NO X**

EXPLAIN: The site does not contain hazardous substances stored in bulk storage containers.

HIGH LEVELS OF HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN NEAR-SURFACE SOILS: **YES X or NO __**

EXPLAIN: Laboratory data for near-surface soils (0-12 inches below ground surface [bgs]) at the site indicate elevated concentrations of Ra-226. EPA has established a removal action level of 5 picoCuries per gram (pCi/g) above background.

CONDITIONS SUSCEPTIBLE TO IMPACT FROM ADVERSE WEATHER CONDITIONS: **YES X or NO____**

EXPLAIN: Limited vegetation cover is present over soil areas on the 650. E. Gilbert Street parcel. High winds could blow unprotected soil off the site.

THREAT OF FIRE OR EXPLOSION: **YES __ or NO X**

EXPLAIN: No threat of fire or explosion exists at the site.

POTENTIAL FOR OTHER FEDERAL OR STATE RESPONSE MECHANISMS: **YES X or NO __**

EXPLAIN: The KDHE Bureau of Environmental Remediation (BER) has been involved with contamination issues related to this site.

OTHER SITUATIONS OR FACTORS WHICH POSE A THREAT: **YES __ or NO X**

EXPLAIN: No other situations or factors exist that could pose a threat.

V. POTENTIAL REMOVAL ACTIONS [40 CFR 300.415(d)]:

(NOTE: The following identifies potential removal actions which may be determined to be appropriate pending further review and study. The proposed actions should be considered preliminary proposals and are subject to change.)

SITE SECURITY: **YES __ or NO _X_**

EXPLAIN: The site is not currently secured by fencing. However, fencing would not protect residents and workers who currently occupy the site.

STABILIZATION OR REMOVAL OF SURFACE IMPOUNDMENTS: **YES __ or NO X**

EXPLAIN: No surface impoundments exist at the site.

CAPPING OF CONTAMINATED SOIL: **YES ___ or NO _X_**

EXPLAIN: Capping of contaminated soil onsite would not effectively mitigate the threat of exposure to radioactive contaminants.

USE OF CHEMICALS TO CONTROL/RETARD SPREAD OF CONTAMINATION: **YES __ or NO X**

EXPLAIN: No chemicals would likely be used to control or retard the spread of contamination from site soils.

CONTAMINATED SOIL EXCAVATION: **YES X or NO__**

EXPLAIN: Excavation of contaminated soils is warranted as a removal action.

SUPERFUND REMOVAL SITE EVALUATION
and
REMOVAL PRELIMINARY ASSESSMENT

REMOVAL OF DRUMS, TANKS, OR BULK STORAGE CONTAINERS: **YES __ or NO X**

EXPLAIN: No bulk storage containers are present on site.

CONTAINMENT, TREATMENT, OR DISPOSAL OF HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS: **YES X or NO __**

EXPLAIN: Disposal of hazardous substances (contaminated soil removed from the site) may be required.

PROVIDE ALTERNATIVE WATER SUPPLIES: **YES __ or NO _X_**

EXPLAIN: The site receives drinking water from the City of Wichita. Alternative water supplies will not be required during any future removal action.

VI. REMOVAL SITE EVALUATION DETERMINATION AND REMOVAL PRELIMINARY ASSESSMENT FINDINGS AND RECOMMENDATIONS:

	REMOVAL NOT WARRANTED—REMOVAL SITE EVALUATION TERMINATED

(Cite one or more of the criteria from SECTION III. REMOVAL SITE EVALUATION CRITERIA, as the basis for the above determination.)

		NOT A RELEASE		NOT A FACILITY OR VESSEL
		NOT A HAZARDOUS SUBSTANCE OR POLLUTANT OR CONTAMINANT		SUBJECT TO RESPONSE LIMITATIONS
		INSUFFICIENT QUANTITY OR CONCENTRATION		WILLING/CAPABLE PRP IDENTIFIED

COMMENT:

X	**REMOVAL RECOMMENDED [__ EMERGENCY X TIME-CRITICAL __ NON-TIME-CRITICAL]**

(Cite one or more of the conditions or factors from Section IV. CONDITIONS TO WARRANT A REMOVAL ACTION, as a basis for recommend that a removal action be conducted.)

	X	EXPOSURE TO HAZARDOUS SUBSTANCES OR POLLUTANTS OR CONTAMINANTS		X	ADVERSE WEATHER IMPACTS
		CONTAMINATED DRINKING WATER	FIRE/EXPLOSION THREAT	X	CONTAMINATED SOIL
		DRUMS, BARRELS OR CONTAINERS	NO OTHER RESPONSE MECHANISM		OTHER FACTORS

(Identify one or more of the removal actions listed in Section V. REMOVAL ACTIONS WHICH MAY BE APPROPRIATE, as examples of the types of response actions which are recommended.)

		SITE SECURITY	DRAINAGE CONTROL		IMPOUNDMENT STABILIZATION
		REMOVAL OF DRUMS, BARRELS, ETC.	SOIL CAPPING	X	SOIL EXCAVATION
	X	CONTAIN/TREAT/DISPOSE OF WASTES	CHEMICAL CONTROLS		ALT. DRINKING WATER SUPPLIES

COMMENT:

	ADDITIONAL REMOVAL SITE EVALUATION RECOMMENDED

(Cite one or more of the conditions or factors from Section IV. CONDITIONS TO WARRANT A REMOVAL ACTION, as a basis for recommending that additional site evaluation be performed.)

		EXPOSURE TO HAZARDOUS SUBSTANCES OR POLLUTANTS OR CONTAMINANTS			ADVERSE WEATHER IMPACTS
		CONTAMINATED DRINKING WATER	FIRE/EXPLOSION THREAT		CONTAMINATED SOIL
		DRUMS, BARRELS OR CONTAINERS	NO OTHER RESPONSE MECHANISM		OTHER FACTORS

(Identify one or more of the removal actions listed in Section V. REMOVAL ACTIONS WHICH MAY BE APPROPRIATE, as examples of the types of response actions which may be appropriate pending the results of further site evaluation.)

		SITE SECURITY	DRAINAGE CONTROL		IMPOUNDMENT STABILIZATION
		REMOVAL OF DRUMS, BARRELS, ETC.	SOIL CAPPING		SOIL EXCAVATION
		CONTAIN/TREAT/DISPOSE OF WASTE	CHEMICAL CONTROLS		ALTERNATIVE DRINKING WATER SUPPLIES

COMMENT:

SUPERFUND REMOVAL SITE EVALUATION
and
REMOVAL PRELIMINARY ASSESSMENT

VII. ADDITIONAL INFORMATION OR COMMENTS:

EPA USE ONLY

VIII. CERTIFICATION

SIGNATURE: **DATE:**
POSITION/TITLE:
OFFICE/AGENCY:

SUPERFUND REMOVAL SITE EVALUATION
and
REMOVAL PRELIMINARY ASSESSMENT
(Supplemental Waste Inventory Sheet)

IX. HAZARDOUS SUBSTANCES, POLLUTANTS OR CONTAMINANT INFORMATION:

MATERIAL DESCRIPTION	CONTAINER INFORMATION					
TRADE NAME/ACTIVE INGREDIENTS	NUMBER of CONTAINERS	SIZE	TYPE	SOLID or LIQUID	% FULL	CONDITION